

A COMPREHENSIVE GUIDE: ALTERNATIVES TO EXPANSION—GROWTH AND DEMOLITION ON THE MIDDLEBURY COLLEGE CAMPUS

ENVIRONMENTAL STUDIES SENIOR SEMINAR
FINAL PROJECT 2001



Courtesy of Carlos Lopez-Hollis

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ACKNOWLEDGEMENTS

We would like to formally recognize the following individuals for their contributions to the completion of this project. Thank you!

ADDISON HOUSE RESIDENTS

GLENN ANDRES

PHYLLIS ARMSTRONG

BABA'S MARKET

ALEXANDRA BAKER

NADINE BARNICLE

BLOSSOM BASKET

CONNIE LEACH BISSON

JENNIFER BLEICH

DENIS BRETON

WILLIAM CLARK

FRED DUNNINGTON

SEPP FIRNKAS

REBECCA KNEALE GOULD

RAY HUDSON

SHELLY HUDSON

NAN JENKS-JAY

CHAD MALONE

JONATHAN MAZIARZ

GEORGE MCPHAIL

DIANE MUNROE

PETER O'LEARY

KEVIN PARIZO

LAURA ROUTH

PARDON TILLINGHAST

H. PETER WIMMER

P. FRANK WINKLER

PREFACE

(DE)CONSTRUCTING A BETTER WORLD

— for my students of the present and my students of the future

Rebecca Kneale Gould

Those of us in the field of religion may be particularly attuned to the challenges of the phrase “practice what you preach.” We are aware that this dictum is easier to pronounce than it is to enact. Ideals motivate us, but what the Buddhists call “right-action” is often mired in constraint. There are the usual constraints of time, money, competing interests and people-power.

Then there are the more unusual ones: such as how to run a concrete “crusher” across the street from the Church of the Assumption of St. Mary while violating neither college construction deadlines, nor a congregation seeking quiet contemplation of the spirit of God.

The story told in these pages is the story of an ideal enacted, of environmental sermons both preached *and* practiced, of a college that leads with a vision and follows though on the messy details. It is a success story.

I heard the opening chapter of this story upon arriving at that annual Rite of Fall: the Breadloaf Faculty Meeting. In the days before classes begin, the Middlebury faculty makes its ritual trek up to the Green Mountains (most drive independently, some athletic and ecologically-minded stalwarts walk, run or carpool). There we enjoy the majestic vistas of the Bread Loaf campus, sip on our coffees and break out our agendas.

The occasion is rarely as literary as the Writer’s Conference, but it often provides the important “updates-on-old-business” and “plans-for-new-busi-

ness” that serve as the necessary lubricant for the academic gearing up process that is about to begin. It is a time for planning and fellowship, for shaking off the cobwebs of summer and getting down to pedagogical business. But it is definitely a *two* cup of coffee meeting.

Just imagine the surprise of friends and family,

then, when I returned from this year’s Breadloaf gathering just brimming over with how excited I was about the faculty meeting. They paused and looked at me with worried expressions. They expressed concern that I perhaps had not taken an adequate

summer vacation. Some offered one more kayak trip on the lake, or another dinner *al fresco*.

“You don’t understand,” I exclaimed, “Middlebury is about to recycle an entire *building!*” Now, my companions sat up and took notice. For someone like me, who enjoys discussing the details of composting over dinner and will earnestly debate the environmental benefits of washing out household bags, this was big news!

The decision to “deconstruct” (rather than to demolish) the old Science Center was, of course, not an isolated experiment in recycling writ large. It came about as the result of a larger vision for college growth and change that included the creation of a new library, but it caught the interest of many because of its positive and innovative environmental implications. “But



View of St. Mary's from construction site. Taken by Rebecca Kneale Gould

how *does* a building get recycled?” I found myself wondering, “Surely you can’t just plop it in a recycling bin like a giant tin can.”

“And what’s the de-construction equivalent of washing off the paper wrapper?” My curiosity started to get the better of me. The historian in me wanted to know if a deconstruction project of this magnitude had ever been attempted on a college campus or in Addison County. The economist asked: “How much will it cost?” The sociologist wondered, “What is the reaction to this project on campus? How about in town? What do the alumni think? How about the neighbors?” And, of course, this scholar of religion wondered: “How will this affect religious life at St. Mary’s?”

As the semester got underway, however, these early September musings quickly got tucked behind books and papers and more immediate tasks. Classes were rolling and thoughts of the old Science Center faded into those moments when I walked by the site, a site that soon started to look depressing with its September —11ish broken facade.

Then, in my environmental studies Senior Seminar (ES 401), as I urged my students to make some initial commitments to their group projects, several voices piped up that re-invigorated my questions, and my optimism.

“Hey, what’s going on with the old Science Center?”

“Are they *really* recycling that building, or are they just *saying* that they are?”

“How *do* you recycle a building, anyway?”

“Wouldn’t other colleges have something to learn from what we are doing here?”

As I listened, I saw the questions that I had mused upon earlier re-emerge in the bodily forms of students with the energy and resources to tackle them. Here was an economist, and here someone who could make scientific sense of materials such as concrete and brass. Over there was a creative young man invested in thinking about the broader cultural impact of sustainable building practices. And here, two students (Ben Sprague and Christie Logue) who would go to create a mock-up for a children’s book on recycling old buildings.

My students’ work, *A Comprehensive Guide: Alternatives to Expansion—Growth and Demolition on the Middlebury College Campus*, is both an examination into a particular case of college-based environmental practices and an expression of many of the larger goals of

the ES 401 seminars. It explores a “case-study” of sustainability in an inter-disciplinary fashion. It probes the “wheres,” “whats” and “whys” of an innovative project with attention to economics, the sciences, local history, social movements and the ethics and politics of environmentally-sound business practices. The project then places these inquiries in a number of broader cultural and environmental contexts.

But while the book is not written singularly or explicitly as a “how-to” manual for other schools, colleges, or towns, it is here—in my view—that its Service Learning dimension can be most clearly discerned. As Kristin Wilson shows us, for instance, the decisions made about the deconstruction of the old Science Center were neither decisions made in a vacuum nor merely “reactive” responses to an immediate problem that needed to be solved. Rather, they were decisions made within the context of Middlebury College’s existing waste management standards, adopted in 1999. From these standards, there emerged in the following year, a particular set of guidelines for construction and demolition which has put Middlebury College on the map as the first college or university to have adopted such rules for new construction and renovations. But such environmental guidelines and standards are located more broadly in the context of the College’s decision to foster environmental studies and environmentally responsible action as a “peak of excellence.” And ultimately, that “environmental peak” is rooted in the College’s own founding mission.

The lessons to be learned by other colleges, then, might be one’s way of looking within to examine core values and goals for a college community, a community which is always, also, located in a town, a region and a watershed. From such introspection can emerge principles and then, plans for action. Middlebury’s administrative, architectural and environmental leaders were able to develop a thoughtful, environmentally responsible and “concrete” (in more ways than one) action-plan for this phase of its library planning. But they were able to do so because the philosophical—and, I might add, ethical—foundations for such action had already been laid.

The deconstruction of the old Science Center, while on the innovative edge of College facilities planning and practices, is part of a broader movement that may shape what some environmentalist have called “the new urbanism.” In his chapter, Carlos Lopez-Hollis,

places these local decisions into a broader story of urban planning and waste management programs that constitute part of environmentally-sound business developments. Lopez-Hollis wants us to see that Middlebury's deconstruction decisions are not "outliers," but rather, are reasonable and economically feasible approaches to managing building, development and re-building with an eye to community and environmental values. For schools, colleges and towns considering similar projects, Lopez-Hollis' chapter helps us to see the extent to which such innovation, while requiring daring and vision, is thoroughly pragmatic. We learn not simply that we *should* make these kinds of building decisions, but that we *can* and that we have good company.

I began this preface by commenting that the story of the deconstruction of the old Science Center is a success story. Like all success stories, of course, it is one which teaches by example, including those moments in the story which are neither simple nor easy.

Holly Carlson's chapter, for instance, teaches us that we ought to be cautious when using the phrase "ninety-eight percent recycled." What does ninety-eight percent really mean? Indeed, what does "recycled" mean? Carlson's meticulous study of the flow of resources from the deconstructed Science Center demonstrates that in addition to taking justifiable pride in an ecological vision, painstaking analysis is also needed. One need not teach in a religion department to know that "the devil is in the details."

Carlson's charts and data-crunching reveal exciting possibilities when it comes to "closed loops" such as crushing concrete and re-using it for on-site grading. The loops unfold into octopus-like tentacles, however, when other materials are considered. On closer inspection, some of the "recycling" involves trucks to Boston and ships to India. As my students have learned in reading environmental economics together, the costs and benefits of such a project can be read in more than one direction. While it is admirable that almost no by-product of the deconstruction has ended up in a landfill, the resource-use involved in the *distribution* of materials raises some red flags amidst the green fields of environmental responsibility.

Finally, the chapter on "Impacts, Interpretations and Opinions" by John Newman and Oren Frey, expands the discussion of Middlebury's successes to include important voices of both affirmation and dissent. While

some of these voices raised more concerns about the initial *building* of the Science Center than the deconstruction *per se*, others asked tough questions of the college's commitment to "growth" and the effects of this growth on town and gown sentiment and politics. As with Carlson's chapter, Frey's and Newman's research constitutes a vital dimension of a report that might be used by other colleges with similar decisions before them. By demonstrating that the response to the deconstruction of the old Science Center was more multi-vocal and diverse than might originally meet the eye, Newman and Frey suggest some avenues for research that colleges might conduct *before* embarking on such a project.

The work of these environmental studies seniors, like the work of building the new library, is —at this writing—a work in progress. They chose to tell the story of deconstruction while the work of that deconstruction was *in medias res*. They sought opinions on the project before the project was finished and, indeed, could be reasonably evaluated. But while their work had, therefore, to be necessarily speculative in some cases, it is deeply constructive and instructive in others. They have built on the visionary work of many who they list in the acknowledgements, among whom I would single out for special praise: Nadine Barnicle for sharing her own data-gathering with students and for helping them articulate their unique perspective; Connie Bisson who gladly gave both her time and her wisdom; Nan Jenks-Jay whose environmental vision for Middlebury College is always articulate, compassionate, and pragmatic and the members of the Administration, Library Committee and related groups who dared to practice what they preach. Most importantly, Diane Munroe labored tirelessly on this project, keeping track of big questions, small footnotes and everything in between, and other members of the Environmental Studies faculty and staff lent insight and support along the way.

The environmental ethics that Middlebury College intends to preach are rooted in its mission and challenged with each new building, transportation, purchasing, investment and land-use decision it has to make. I look forward to new opportunities for seeing how the College will put its extraordinary environmental vision into practice. I wonder what will be announced at the next Breadloaf meeting? I hope we all car-pool as we head up to find out!

INTRODUCTION

The demolition of Middlebury College's old Science Center had already begun when our Environmental Studies Senior Seminar commenced in the fall of 2001. We found that the majority of our classmates were unfamiliar with the activities at the site, and we felt that our lack of awareness characterized the community at large. We were first drawn to investigating the old Science Center because we understood it was being recycled. "How do you recycle a building?" is what we asked ourselves. This initial curiosity set off a number of questions such as: What was the decision-making process behind the current operation? Why was a thirty year-old building being torn down? Along with grappling with the dynamics of the planning and decision making processes, we also wanted to learn the local opinions and perceptions of the project. Through conducting interviews, consulting resources on the web, and researching publications, we have compiled a comprehensive study that outlines the multiple dimensions involved in such a project.

The first chapter concentrates on the multifaceted planning process that determined the fate of the old Science Center. The author details the development of the college's environmental principles that guided the operation. Rather than using traditional

demolition, which wastes valuable resources and squanders limited landfill space, the college hired a company to deconstruct and recycle ninety-eight percent of the building.

The second chapter will address the emergence of deconstruction and recycling in the context of demolition and discuss the economic and environmental benefits that have fueled its popularity. The third chapter will trace products from the old Science Center to both local and global locations and will discuss the process of recycling them. Discussion will conclude with an analysis of town and college perspectives related to demolition on the Middlebury College campus.

While our group was able to answer the questions we set out to address, larger questions arose throughout the course of our investigation —Did the various costs of the deconstruction and recycling process outweigh the benefits? Did the drive to be environmentally responsible come at the expense of social responsibility? In the end, our group was divided on the answers to these questions. It is our hope that what follows will not only increase your awareness of the building deconstruction and recycling process but will also allow you to answer these tougher questions for yourself.



Courtesy of Rebecca Kneale Gould

I. DYNAMICS TO EXPANSION: MIDDLEBURY'S APPROACH TO GROWTH

Kristin Wilson

WHY DECIDE TO RECYCLE A BUILDING? AN INTRODUCTION TO MIDDLEBURY COLLEGE'S OUTLOOK AND PHILOSOPHIES REGARDING FUTURE CAMPUS EXPANSION

Recycling of the old Science Center and construction of a new forty million dollar library are just two components of a larger vision for Middlebury College in the coming years. In 1995, the Master Plan—a document addressing future campus growth—was prepared by the Wallace Floyd Design Group. The Plan is flexible and provides a series of “planning and design guidelines,” including a fixed framework of roads, paths, and open space around which new buildings may be constructed. The Middlebury College Planning Commission formally accepted the Master Plan on February 18, 2001.¹

As part of the Master Plan, a Project Review Committee was formed to oversee proposals still in the conceptual stages, for “new development, renovations, and environmentally related projects” on campus. In addition to the Master Plan, this committee adopted a document outlining guiding principles for “environmental goals pertaining to construction, renovation, operation, and maintenance of campus facilities.”² This document states that all individuals and organizations affiliated with campus design, construction, maintenance and demolition must be introduced to these guiding principles and additionally, that those “consultants who contract to provide services for the College will be legally bound to address the Guiding Principles and the related Procedures and Practices.” One principle of particular interest is:

It is resolved that...the College and its appointees shall consider: energy systems, life cycles, water use, scale and location, light pollution, recycling and waste management, materials, community and product sources, community and regional impacts, transportation, aesthetics, indoor air quality, construction site management, viewsheds, open space, and other issues related to the campus.

Through these Guiding Principles, the College is emerging as a national leader in incorporating more environmentally sound decisions into campus planning, with the old Science Center deconstruction most recently exemplifying this.³

In July 1999 the Office of Facilities Planning was created at Middlebury with the intent of creating an on-campus, all-access site that could provide information on all projects in “various stages of completion” to interested parties, as well as serving as a single contact point for regular communication between on and off-campus constituents. Facilities Planning has a three-fold process for each new facility on campus which includes the development of an overall program (both a functional and a space program) for the facility, architect selection, and finally, construction contractor and construction management firm selection. Projects currently being overseen by the Office of Facilities Planning include the new library, as well as residential housing & dining, recycling, and athletic facilities.⁴

In October 2001, the College formally adopted “Construction and Demolition Waste Management Best Practices.” Adhering to excerpted directives adopted by the trustees independently in 1995 and 1999 where the College “...gives a high priority to integrating environmental awareness and responsibility into the daily life of the institution,” the document outlines six general practices to provide a framework for construction and demolition waste management. These practices are divided into three sections: 1) construction and demolition waste management best practices (including a pre-demolition audit to see which materials may be whole-salvaged), 2) hazardous waste management best practices, and 3) quality control best practices. According to the document, it is expected that all contractors will be held accountable for adhering to these principles.⁵ For excerpts from this document, including specifics regarding the pre-demolition audit, please see Appendix A.

WHY A NEW LIBRARY? A CLOSER LOOK AT THE DECISIONS AND TIMELINE OF EVENTS LEADING UP TO THE DECISIONS FOR CONSTRUCTION AND FOR LOCATION OF THE NEW LIBRARY



The old Science Center, Office of Public Affairs, Middlebury College

A lack of space in the existing library was the driving force behind the decision to construct a new facility that could accommodate the growing needs of the College's collection. Maintenance of the existing collection was also a main consideration. Currently, lack of climate-control threatens the integrity of the collection, especially the special collection and the important documents it houses, in Starr Library.⁶ Therefore, in 1998, architects from the firm of Gwathmey Siegel & Associates were commissioned for four designs of a renovation of Starr. The prevailing thought at the time was to use the old Science Center as a temporary library, while launching renovations of Starr. One of the renovation plans included demolishing eight-five percent of the existing structure, saving the historic core of the building, and then significantly increasing the area of the building by creating new climate-controlled additions that would wrap around this internal core. The trustees did not approve the plan however, in part because donations for a new Center for Literary and Cultural Studies, deemed the Axinn Center, would not materialize if Starr were not used as the core of this proposed building.⁷

Emphasis then switched to the possibility of renovating the old Science Center to become a new library. However, the building was not well built and structural integrity was rapidly deteriorating. With no insulation, an exposed concrete frame, and moisture creeping in from the outside, the concrete had slowly lost its strength and at most, had approximately twenty-five

years left of "life" before major repairs or demolition would become necessary. Structural problems did not stop there, either. Some members of the Project Review Committee floated the possibility of making the building functional by wrapping it in marble. But other structural problems thwarted such plans. The committee discovered that the building would not be able to support the number of standard stacks necessary to house all the volumes in the collection, let alone to support compact stacks. The size of the building would have needed to be doubled to accommodate the needs of the collection, and since this did not make a whole lot of planning sense, it was decided that a new plan was necessary.⁸

Could the building have been used for something else, if not the new library? For awhile, alternate use ideas were entertained. Some proposed a central dining facility for Wonnacott Commons or art lofts for the Art Department. Alternatives were suggested in part because a new three million dollar ventilation system had been installed for the Chemistry department shortly before the building's decommission. On the other hand, the building had not been a well-liked structure even from its inception. Of six possible locations for the building, its actual location was not among the initial recommended sites at all. Many felt that the science center choked the historic view of the College from the town and that the building, combined with the closure of the old Storrs Avenue and the bulldozing of a playground to make the new parking lot for the build-

ing, alienated the town. Another negative aspect of the building was that its interior no longer reflected the original architectural design. The intended open core of the building had been modified with the extension of the science library on the top floors.

Because of many of the reasons given above, the decision to take down the old Science Center seemed a logical if reluctant one. Most of all, however, the trustees wanted a “new face” for the east side of campus.⁹

THE NEXT STEPS – PLANNING AND PERMITTING

While there was support for taking down the old Science Center, the Library Planning Committee initially did not recommend this site for the construction of the new library. This was mainly because they believed that renovations of Starr Library were still possible, but also because the building would not be on the main axes of campus. When the committee finally committed to the construction of a new library building however, they realized that because of the long-term planning ideas of the college, there really was no alternative location. With the site secured as the location for construction of the new library, the first action that the College took was to have a town meeting where all interested parties could voice their concerns and priorities in the presence of the architect himself.¹⁰

As a result of that meeting, the design for the new library was modified to address local concerns. The new library size was minimized and it will be as narrow and as low as possible from the town’s perspective in the hopes that it will enhance the front of the campus instead of creating another wall between the town and campus. Design elements meant to integrate and attain a true feeling of cohesiveness from the campus side of things include the curvature of the design to radiate movement back onto the main portion of campus, the main door located on the up-campus side, and having the chapel walk terminates at this front entrance.¹¹ The goals that the new library hopes to attain include the following:

...a building expressive of the centrality of the library in the life of the college, a building physically serving the long-term needs of the library, a user-friendly building, a building recognizing the changing character of information

sources, storage, retrieval, and communication, a building providing the widest range of use, a building fostering efficiency, and an environmentally sensitive and comfortable building.¹²

For more insight into reactions from Middlebury College and community members regarding these library plans and goals, please see Chapter Four.

Most recently in April 2001, the town of Middlebury gave its “preliminary conceptual approval” to the plan and the College began the Act 250 and the Town of Middlebury’s permitting and zoning processes.¹³ Act 250 is the result of an initiative by Governor Deane Davis who, in 1969, developed the Commission on Environmental Control to deal with development issues, in particular issues regarding temporary residences that were increasingly stressing town resources state-wide. The following year, many of the recommendations of the Commission were passed as Act 250. In its original form, Act 250 had two parts: 1) a permit process and 2) a state land-use plan. Only the first part of the act was passed by the legislature; the second part met “...with immediate opposition, as it would restrict the potential development of virtually all of the land in the state, not just big developments built by out of staters...”¹⁴

The permitting process that was passed, “...evaluates the impact of a development project under a number of environmental criteria.” All ten criteria, which “...include such issues as air pollution, waste disposal, wetlands, erosion control, traffic, impact on schools and municipal services, and conformance with town and regional plans,” must be met in order to obtain permitting approval. Six to seven hundred permit applications are accepted annually by the state, more than ninety-five percent of which are approved. Of those approved, seventy percent are issued within less than sixty days.¹⁵

Act 250 has been quite successful in controlling and improving the “quality of development” within the state. But its weaknesses, primarily caused by the lack of a cohesive state land-use plan, include not dealing with cumulative development such as strip malls, and encouraging “scattered and piecemeal” development, a strategy employed by developers to side-step much of the permitting process. In response to some of the problems left unresolved by Act 250, in 1988 the state passed Act 200. This piece of legislation was meant to encourage town planning and its goal was for town plans to combine with state permitting to “...create

comprehensive and coherent planning and development..." for the state as a whole.¹⁶ But it remains to be seen what impact Acts 250 and 200 (in addition to local legislation may ultimately have on College growth and building projects.

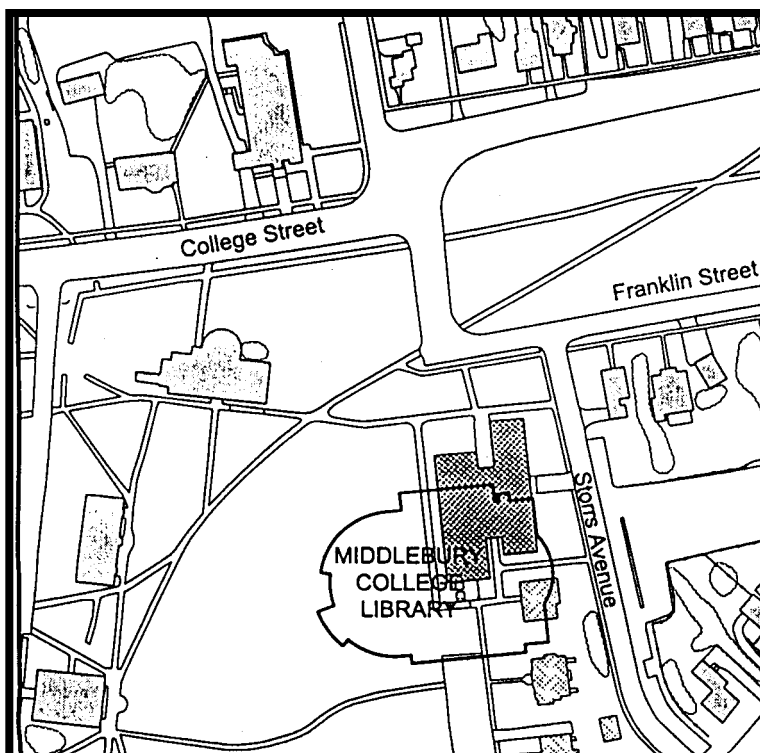
WHERE'S IT GOING? A LOOK AT WHAT CONSTRUCTION OF THE NEW LIBRARY MEANS ON THE GROUND

Since the new library will be located in the space occupied by the old Science Center, demolition of the old Science Center was necessary. "Rather than haul the rubble to the landfill," the College made the decision to recycle ninety-eight percent of the building, a practice consistent with the guidelines adopted by the trustees in 1999.¹⁷ A pre-demolition audit was completed resulting in the donation of old Science Center equipment, much of which went to area schools. From the building itself, approximately six hundred tons of concrete, one hundred and fifty tons of metal, and seventy-five tons of wood will be recycled from the six-story building. More specific information regarding the tracing of products harvested from the old Science Center, will be discussed in Chapter Three.

The new library will be located slightly more southward than the old Science Center to enhance the town's view of campus and to have a direct path between Old Chapel and the entrance to the new library. This necessitated the relocation of four College-owned houses along Storrs Avenue. To facilitate the relocations of these houses and to quell surfacing concerns regarding these relocations, the College hired the firm of Keefe & Wesner Architects, P.C. to conduct a "building relocation and site assessment study." Based on many of their conclusions and recommendations, the College decided to move the houses to, "...two lots on South Street at the intersection of Porter Field Road, one lot on the corner of Shannon and Weybridge Streets, and one to 121 South Main Street..."¹⁸

The primary concerns regarding the relocation of the houses had to do with maintaining both historical integrity and open space. To address these issues, appropriate efforts were made to identify existing gaps in the surrounding communities and to match the houses to appropriate neighborhoods, both in terms of stature and age. Facilities Planning also faced concerns over loss of habitat. By following Act 250 procedural guidelines, it was determined that there were no endangered species or critical habitats that would be destroyed with relocation of the house.¹⁹ This was an issue for one interviewee presented in Chapter Four.

Location of the new library,
Office of Facilities Planning,
Middlebury College



WHAT'S SO GREEN ABOUT IT ANYWAY? A CLOSER LOOK AT THE ENVIRONMENTAL ASPECTS OF THE NEW LIBRARY



The new library, <http://www.gwathmey-siegel.com>

At the urging of the College, Gwathmey Siegel & Associates worked closely with both LEED (Leadership in Energy & Environmental Design, a priority program of the US Green Building Council), and Efficiency Vermont programs.²⁰ LEED is a voluntary, nationally-used rating system which "...evaluates environmental performance from a 'whole building' perspective over a building's life cycle." The criteria by which buildings are evaluated include: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, innovation and design process. The total number of credits earned within each of these categories are combined and different levels of green building certification are awarded - certified, silver, gold, or platinum. The project certification process is intensive and includes training workshops and an accreditation exam as well.²¹ Efficiency Vermont is a state-wide program aimed at helping consumers save money while preserving Vermont's environment through efficient energy use. It "...operates independently from the state's electric utilities and offers energy-saving programs, technical advice, and financial incentives..." to reach its goals.²²

With the use of the criteria provided by these groups, Gwathmey Siegel & Associates were able to design a building that not only met functional criteria and the town's needs, but also one that met a suite of

environmental standards as well.²³ The new library is expected to receive a silver or even a gold rating by LEED. Environmental features of the new library are to include green-certified wood from Vermont, triple-glazed windows to reduce energy lost during heating and cooling, light-control blinds to minimize light pollution and conserve energy lost via radiant heat transfer, interior bike storage areas for employees biking to work, and efficient energy systems that control individual, ambient room conditions and minimize energy expenditure.²⁴ Additionally, the College is trying to incorporate and stimulate local and regional economies by purchasing bike racks and furniture for the new library from local vendors, thus reducing shipping costs and associated pollution while promoting local commerce. This partnership is expected to continue with further construction projects at the College.²⁵

CONCLUSIONS

Could more have been done? It seems like the compromises between town, functional, and environmental needs were satisfactory ones. Surely more environmentally sound practices could have been incorporated, but it seems at an exorbitant price. For example, one proposal included saving run-off from the roof as gray water that could be used within the building for non-drinking purposes for which potable water would otherwise be used. This would reduce storm sewer run-off and the amount of potable water taken from the town. The idea was great, but in all practicality, the pumping and filtering systems needed for the process would have taken a lot of electricity; since regionally, electricity is a more limited resource than water, the plan was unsatisfactory in the final analysis.

While many "green" practices were incorporated into the design of the new library, it is important to also remember that environmental priorities alone were not the focus of this building project; instead, issues such as functionality and town concerns were.²⁶ As such, it seems logical that more "green" principles could have been included in the new design had such priorities been at the forefront of planners' priorities. While many environmental objectives were achieved for which applause may be granted, it is fair to say that many more "green" alternatives could have been possible in the new design. This design is a reflection of compromise and may be one model, but importantly not the only model to consider.

Notes

- ¹ http://www.middlebury.edu/facilities/master_plan.html, Internet.
- ² http://www.middlebury.edu/facilities/project_review_committee.html, Internet.
- ³ Middlebury College Project Review Committee, "Designing the Future, Guiding Principles, Middlebury College," available from <http://community.middlebury.edu/~enviroc/gbprinciples.html>, Internet.
- ⁴ http://www.middlebury.edu/facilities/office_of_facilities_planning.html and http://www.middlebury.edu/facilities/phase_one_projects.html, Internet.
- ⁵ "Middlebury College Construction and Demolition Waste Management Best Practices", available from Middlebury College Office of Facilities Planning.
- ⁶ <http://www.middlebury.edu/~lib/libwebabout/libspecial.html>, Internet.
- ⁷ Glenn Andres, Professor of Art and Architecture, Middlebury College, personal communication 11/14/01.
- ⁸ <http://www.middlebury.edu/~lib/libwebabout/libspecial.html>, Internet.
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II. DECONSTRUCTION AND RECYCLING WITHIN THE CONTEXT OF DEMOLITION

Carlos Lopez-Hollis

Deconstruction. (n.) (1) The systematic disassembly of residential and commercial buildings. (2) An economic opportunity that stimulates community-based economic development through business and job creation. (3) An environmental practice that diverts waste from landfills and incinerators, reduces the dependence on virgin feedstocks, and provides a supply of reusable materials for construction and renovation projects.¹

“Deconstruction is a new term to describe an old process —the selective dismantling or removal of materials from buildings before or instead of demolition,” says Peter Yost of the National Association of Home Builders.² Approximately one hundred and fifty thousand demolitions occur each year, meaning that an abundance of wood, metals, masonry, plaster and dry-wall that can be used for new or existing structures risks entering the waste stream.³

The deconstruction and recycling of buildings is a logical strategy quickly replacing traditional methods of site clearance. Standard demolition practices are characteristically swift and easy, requiring only a blast of dynamite or a swing of the wrecking ball. A few components may be stripped before the structure is destroyed, but generally a majority of the building’s structural elements and additions are ruined in the traditional approaches. The debris is then broken down into manageable pieces and disposed of in a landfill.

Deconstruction is a different approach to basic demolition. It is often more time-intensive, can demand greater human resources and in some cases more advanced technology. It is also more expensive. However, while the costs involved with the actual deconstruction process can be high, people nationwide are discovering that the careful disassembly of buildings eventually reaps numerous economic benefits while considerably limiting environmental costs.

Deconstruction offers viable economic incentives and opportunities —one example being that recycled supplies lessen the cost of other construction projects. Habitat for Humanity, for instance, lowered new home

prices by five thousand dollars simply by using salvaged materials from buildings in Wake County, North Carolina.³ Deconstruction also provides a new range of employment opportunities for low-skilled workers. The emergence of recycling projects around the country, especially in urban areas, is functioning to decrease unemployment rates.⁴ In projects where budgets limit the hiring of workforce, volunteers can be recruited who are allowed to keep materials they want in exchange for their work.

Reducing waste from a building limits disposal costs and increases revenue through the sale of reclaimed materials. Many of the supplies can be sold for up to one hundred percent of the item’s original value. Small businesses are developing to act as suppliers of reusable materials salvaged from deconstruction projects. These businesses are emerging to handle and distribute the goods, as well as to establish networks of trade and markets for sale. Deconstruction is also being viewed as a creative and responsible way for a company to manage existing assets; the original investment is relocated to a new project rather than wasted.

Deconstruction, rather than traditional demolition (razing without an eye for the recycling and reuse of component materials), is a healthy alternative to our nation’s wasteful consumption of resources. According to the U.S. Green Building Council, commercial and residential buildings account for forty percent of global annual raw material use (Table 1).⁵ By reusing materials salvaged from the estimated one hundred and thirty six million tons of waste generated from demolition each year, we can substantially reduce stress placed on ecosystems from over-extraction.

A further benefit of deconstruction is the great potential for energy conservation. The construction industry, which consumes eleven percent of U.S. energy annually, uses eighty-five percent of its energy to produce and transport materials for new construction.⁶ These levels of energy consumption can be minimized by locally reusing the materials from deconstructed buildings.

Table 1. The below statistics on traditional building and demolition highlight deconstruction's (and construction with recycled or reused materials) potential for saving raw materials and energy, and for reducing waste.

| | <i>Traditional Building</i> | <i>Traditional Demolition</i> |
|---|------------------------------------|--------------------------------------|
| <i>Global Annual Raw Material Use</i> → | 40% | |
| <i>Annual US Energy Use</i> → | 11%* | |
| <i>Annual Waste Generation</i> → | | 136 million tons |
| <i>Percent of Demolition Debris in VT's waste stream</i> → | | 30% |

*85% of this is for the production and transport of *new* materials

In Vermont, construction and demolition debris accounts for thirty percent of the state's waste, prompting the Vermont Agency of Natural Resources (ANR) to develop strategies for reductions.⁷ ANR's two strategies are waste reduction (involving prevention and reuse) and recycling. The agency has also held meetings with building professionals to ascertain their needs and has determined that these builders want simple, economical solutions and some successful case studies to follow. To develop these case studies, ANR has created an eighteen thousand dollar grant to help fund reuse and recycling components for up to five different construction and deconstruction projects. The agency has also provided a Vermont Construction Site Reuse and Recycling Database which locates companies in and around Vermont willing to purchase material for recycling and accept compensation for demolition debris. Several of these companies are listed in Table 2. In addition, ANR has a Construction Site Waste Management Reduction Plan that provides simple waste reduction suggestions to construction managers

such as persuading suppliers to take back excess material or designating a single location for cutting wood so that scraps are easily collected.

Building deconstruction and recycling is a unique strategy for development because it uses existing resources, enabling us, as Chad Malone, T-Rex demolition manager, said, to start looking at buildings as "our future forests, quarries, and mines." T-Rex, for example, saw Middlebury College's old Science Center as a supply of raw materials to be harvested, not just an existing structure that had to be torn down.

The practice of building recycling has the potential to grow dramatically as physical and economic expansion remain important goals but also as values placed on open space and environmentally sound activities broaden. Deconstruction will afford successes in both environmental and economic arenas as the recycling of debris will reduce waste and the demand for natural resources, slow land consumption, decrease energy use, and stimulate economies.

Table 2: An abbreviated list of Vermont companies dealing in construction and demolition materials for recycling.

| Material | Company Name | Vermont Location |
|--------------------|--|---|
| Concrete | A. Marcelino & Company, Inc. Rutland County Solid Waste District | Williston Rutland |
| Deconstruction | Lignum Vitae Inc. Recycle North Second Harvest | Middlebury Burlington Jeffersonville |
| Used Building Mat. | Architectural Salvage Warehouse Green Mountain Structure Recycling Lignum Vitae Inc. | Burlington Montpelier Middlebury |
| Scrap Metal | Addison County Solid Waste District All Cycle Waste, Inc. American Salvage Metals All Metal Recycling | Middlebury Williston Barre Morrisville |
| Clean Wood | Addison County Solid Waste District Green Mountain Structure Recycling | Middlebury Montpelier |

Source: VT Agency of Natural Resources Reuse & Recycling Listings

For a complete listing, see: http://www.anr.state.vt.us/dec/cf/wm/CandD_SearchList.cfm

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III. DEMOLITION DEBRIS TO FUNCTIONAL PRODUCTS: TRACING MATERIALS FROM MIDDLEBURY COLLEGE'S OLD SCIENCE CENTER

Holly Carlson

TRACING MATERIALS FROM THE SCIENCE CENTER DEMOLITION

The formation of a plan to recycle, in preliminary predictions, ninety-eight of the old Science Center's building materials incorporated Middlebury College's desire to be environmentally sound with the creative outlook of T-Rex. The purpose of this section is to trace the flow of these materials from the demolition site to recycling and manufacturing centers both locally and globally, to discuss the subsequent effects of this recycling effort, and to provide examples of large-scale recycling strategies and options. Information will be presented on the tonnage of specific materials harvested by T-Rex, their destinations, and their ultimate usage in various products and forms. Tracing these materials gives us insight into global markets at work and allows us to discuss both the positive and negative environmental and economic ramifications of recycling demolition debris.

Three primary categories of materials emerged from the college's old Science Center —reused materials, discarded materials, and recycled materials. In this discussion, the difference between reused and recycled materials is that reused materials have been distributed to various locations for use in their current state and form, while materials tagged for recycling have been altered in state and form before being reincorporated into new products for use. Reused materials were predominantly “harvested” by the college before T-Rex assumed responsibility for the building and its remaining materials, as stipulated by the pre-demolition audit.

REUSED MATERIALS

Items marked for reuse included three air handlers, the observatory/dome, an antenna tower, and numerous materials donated to area schools.¹ Classroom materials and a variety of scientific tools were made available on a first-come, first-serve basis to schools throughout the region at a series of open houses during the summer of

1999 (Table 1). Officials and teachers from schools around Vermont, some coming from Rutland, Shelburne and Proctor and even Trinity Christian School in Concord, New Hampshire, benefited from Middlebury College's Open Houses by obtaining materials of use to them.² The three air handler systems were purchased by the Proctor School District at a cost of twenty-five thousand dollars each compared with a cost of one-hundred and seventy thousand dollars new, representing a considerable savings for the participant schools.³

DISCARDED MATERIALS

As stated above, preliminary predictions by T-Rex indicated that ninety-eight percent of the materials from the old Science Center will be recycled (or reused), meaning that only two percent of the materials will find their way into landfills. The materials that cannot be recycled or reused included roofing materials, Styrofoam, and some insulation from around pipes.⁴ T-Rex sought to be creative in developing potential uses for demolition debris, but these few materials were exceptions for which no use could be found. One example of creative material use came from roughly one hundred cubic yards of wood that were initially deemed non-recyclable but in the end were able to qualify for use in particleboard and plywood.

RECYCLED MATERIALS

Materials that will be recycled made up the bulk of the old Science Center. These materials are perhaps most important to trace because their destinations will be distributed around the globe, where they will be processed and altered before emerging once again as usable products. Goods reclaimed from the site included concrete, glass, steel, iron, wood, copper, aluminum, brass and limestone.⁵

Table 1: Materials donated to area schools from the Middlebury College's old Science Center.

| Schools Involved | | Science Equipment | | Miscellaneous | |
|----------------------------|-------------------------------|-------------------|------------------------------|---------------|---------------------|
| <u>VERMONT</u> | | 64 | microscopes | 2 | podiums |
| <i>Bristol:</i> | Mount Abraham U.H.S. | 4 | dissecting scopes | 2 | plotters |
| <i>Castleton:</i> | Castleton Village School | 3 | dissecting microscope frames | 1 | TV/VCR |
| <i>Middlebury:</i> | Aurora School | 12 | spectrometers | 3 | Polaroid cameras |
| | Mary Hogan School | 1 | calorimeter | 1 | circuit board |
| | Middlebury U.H.S. | 3 | oscilloscopes | 1 | transformer |
| | St. Mary's School | 1 | petrographic microscope | 1 | hotwater heater |
| <i>Orwell:</i> | Orwell Village School | 1 | photoreactor | 15 | electronic switches |
| <i>Proctor:</i> | Proctor School District | 1 | digital photometer | 1 | electric motor |
| <i>Rutland:</i> | Mount St. Joseph Academy, | 2 | microscope light sources | | |
| | Rutland Area Christian School | 7 | pH meters and probes | | |
| <i>Shelburne:</i> | Gailer School | 1 | pantograph | | |
| <i>Shoreham:</i> | Shoreham Elementary | 1 | box chromatography sheets | | |
| <i>Vergennes:</i> | Vergennes H.S. | 10 | boxes filter paper | | |
| <i>Weybridge:</i> | Weybridge Elementary | 2 | UV lights | | |
| | | 1 | spotlight | | |
| <u>NEW HAMPSHIRE</u> | | 1 | light filter machine | | |
| <i>Concord:</i> | Trinity Christian School | 1 | large air table | | |
| | | 1 | metal box light table | | |
| | | 2 | Bunsen burners | | |
| Classroom Materials | | | ring stands | | |
| | | 6 | lamp sets | | |
| 35 | computers (mostly Macintosh) | 1 | melting point unit | | |
| 1 | computer table | 2 | drying ovens | | |
| 100 | armchair desks | | mortar & pestle sets | | |
| 32 | soapstone-topped tables | 1 | water bath | | |
| 106 | lab stools | | magnetic stirrers | | |
| 13 | floor cabinets | 4 | Bell jars | | |
| 2 | laminated-topped lab tables | 7 | Aquariums & supplies | | |
| 1 | wooden bookcase | 3 | portable fume hoods | | |
| 18 | wooden chairs | 1 | electronic balance | | |
| 6 | wooden shelves | 4 | triple beam balances | | |
| 2 | slide projectors | 2 | vacuum pumps | | |
| 1 | overhead projector | 1 | tabletop centrifuge | | |
| 1 | drafting arm | 1 | refrigerated centrifuge; | | |
| | | 10 | centrifuge flasks | | |
| Office Materials | | 1 | frequency converter | | |
| | | 3 | stirring machines | | |
| 32 | wood/glass wall cabinets | | | | |
| 3 | file cabinets | | | | |
| 1 | file card cabinet | | | | |
| 2 | wooden mailbox units | | | | |

Source: Middlebury College Office of Facilities Planning, Materials Donated from Old Science Building, Middlebury College document.

Concrete/Glass

T-Rex was responsible for the handling and distribution of all materials harvested from the demolition process, but worked most intensely with the concrete and glass, which comprised approximately eighty percent of the building.⁶ The demolition company crushed these products together on-site to create a fill that will be used by the college during construction of the new library.⁷ Any remaining fill will be stockpiled by the college and used in future construction projects of buildings or roads.⁸ Incorporating the glass into the concrete fill was one of the more creative ideas researched and employed by T-Rex, as the glass aids in water percolation through the fill, reducing the potential threat and effects of frost heaves.

The weight of the total volume of concrete and glass was estimated to be approximately six hundred tons.⁹ If this material were not recycled and used on-site, the college or T-Rex would have had to pay trucking costs to Burlington, VT—a forty-five mile drive one-way. T-Rex estimated that trucking this material away would have required three to four truckloads per day for a period of thirty days. Chad Malone, the demolition manager for T-Rex, estimated that such transport would have cost the company six hundred and fifty dollars per truckload. Resources saved by processing and using this material on-site, then, were not only economic but also included air quality, as otherwise there would have been a negative impact on Vermont's air quality resulting from the burning of fossil fuel from the diesel-powered trucks.

Metal (Steel/Iron)

Approximately one-hundred and fifty tons of iron and steel were removed from the building and sold to Rovner's Metal, a scrap yard located in Manchester, New Hampshire.¹⁰ Here the iron was divided into light and heavy grades, the lighter of which was shredded and distributed to steelyards globally (exact locations for these steelyards are unknown). The current low demand for this material in domestic markets necessitated, from an economic standpoint, that the scrap be sent abroad. Heavy grade iron has been sent to South America, funneled into the auto industry for steel-plated structures, or melted in furnaces for new beams and pipes.¹¹ The demand for recycled steel is high, in part due to the fact that processing costs for producing new steel are markedly higher.¹²

Primarily, financial markets determined the locations for this type of material, but these markets have been historically volatile and subject to large fluctuations. Currently the global markets for many demolition debris materials are experiencing large drops in prices because of an unfortunate glut of concrete, metal, and other construction materials resulting from the clean-up efforts surrounding the World Trade Center catastrophe in New York City.¹³ This illustrates the globalization of economic markets and the linkages these markets can create between seemingly unrelated places and events. It is interesting how such a national, and indeed global, tragedy can be tied to such a local issue as demolition on the Middlebury College campus. Global markets may remain depressed for some time, as the supply is not expected to slow since these markets are a function of the necessity of demolition companies to get rid of their materials and keep them out of landfills. Chad Malone, the demolition manager for T-Rex, said that "landfill waste costs are the most compelling" reason for companies to recycle instead of discarding materials.¹⁴

Copper

Salem Metal, of Salem, New Hampshire, purchased all of the copper recovered from the demolition work of T-Rex. Copper is known as "demolition gold," because it draws the greatest profit of any material in the demolition process, has the potential to be infinitely recyclable, and is the most recycled engineering metal in use today.¹⁵ Economically, primary-grade copper scraps command a value of at least ninety-five percent of the metal's primary value from copper ore. Further, the processing costs of recycling are lower than extraction from ore, resulting in a large market for recycled copper.¹⁶ In fact, copper use in the United States each year has a relatively equal dependency upon recycled and newly mined copper.

Environmentally, copper scraps that will be recycled serve as above-ground reserves, reducing reliance upon newly mined copper ore, which prevents degradation of the earth's surface and the formation of harmful acids that can result from mining activities. Copper recycling also keeps material out of landfills and reduces energy consumption and greenhouse gas emissions.¹⁷ Energy is saved because scrap metal is already in a metallic form, thereby eliminating the steps of mining, crushing, transporting, smelting, and refining that are included in the processing of copper ore. Only

a small amount of energy must be expended again to melt and refine copper scrap. Recycled copper cannot, however, satisfy all copper demand or be used in electrical wiring and cables because these products require extremely pure copper to ensure good electrical conductivity. In the case of this building demolition, the copper Salem Metal received from T-Rex has been sent overseas to unknown locations after cleaning and sorting, where it will likely be returned to usable forms in piping and roofing products.

Aluminum/Brass

Minor quantities of aluminum were also harvested from the demolition, and have simply been recycled in the same way that cans and pipes would be, by melting the metal and molding it into new forms.¹⁸ Much like copper recycling, aluminum recycling is very energy-efficient, expending ninety-five percent less energy than is required to make aluminum from ore.¹⁹ The small amount of brass (a copper alloy) taken from the old Science Center will be sent to Boston and then eventually to India – which, according to Salem Metal, hosts the largest brass market in the world.²⁰ There the brass will be used to create various commercial products such as urns, bowls, and jewelry.

Limestone/Wood

The façade of the old Science Center consisted of limestone blocks which have been separated from the mortar that held them together and subsequently stored by T-Rex. Small amounts of this limestone has likely been crushed and included in the concrete/glass fill, but intact pieces have been transported to T-Rex's supply yard in New Hampshire where they will be stored

and eventually dispersed among contractors and homeowners for various landscaping projects.²¹

Approximately seventy-five tons of wood were removed from the old Science Center during the demolition process, most of which have been sent to the Environmental Resource Return Corporation (ERRCO), a company located in Epping, New Hampshire.²² The company has the capacity to process nearly six-hundred tons of waste per day, and traditionally assumes the responsibility of separating recyclable waste from non-recyclable waste, typically recycling ninety-seven percent of what it receives.²³ While working with T-Rex, however, ERRCO received wood that was already completely separated from other debris, ensuring a clean recycling process and a higher percentage of material actually being recycled. ERRCO accepts a variety of materials including wood, concrete, rock, and metals, mainly because the company believes that with a good portion of the “construction and demolition debris waste stream being recoverable, it makes little sense to use valuable landfill space for this material.”²⁴

Three primary products are made by ERRCO, the first of which consists of wood chips sold as fuel to a bioenergy company in Maine.²⁵ A little over half of the material ERRCO receives is invested in this process. The other two products are a soil-textured material used for a daily cover in landfills, which contains a small but, according to ERRCO, apparently safe (and undisclosed) percentage of lead from paint, and an aggregate used for road fill. ERRCO makes a profit on the tonnage it receives, but the three resulting products are not profitable, only providing a means for ERRCO to dispose of its end products in a sustainable manner, a requirement of the company's state permit.

CONCLUSION

Middlebury College and T-Rex worked together to produce a demolition project that created as little landfilled material as possible (Figure 1). Out of all the demolition debris, concrete and glass seem to be the materials most efficiently processed

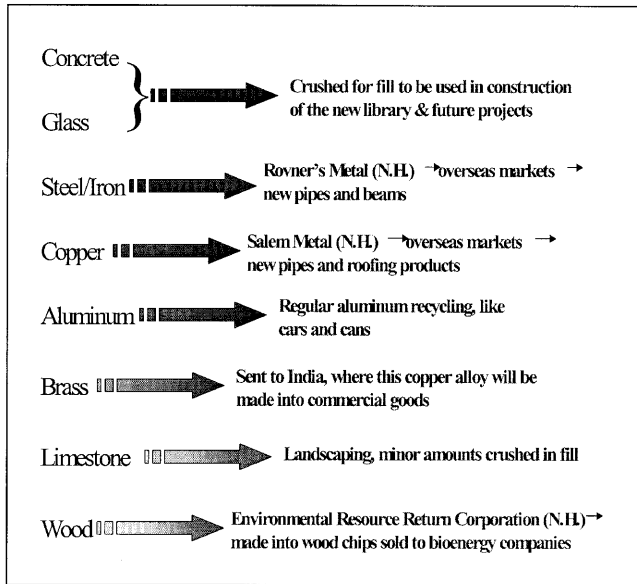


Figure 1: Flow chart diagramming materials taken from Middlebury College's old Science Center and their various destinations

because they will be altered and reused on-site. Materials donated and sold to area schools were also efficiently “processed” because they neither had to be altered in form nor transported long distances. Every other material removed from the old Science Center had to be transported to different locations, in many instances overseas, and that transportation has not only resulted in economic costs but has also had environmental consequences in the form of air and/or water pollution, resource and energy consumption, and greenhouse gas emissions. With this said, the very recycling of these materials at such a large scale has conserved raw natural resources, reduced energy consumption, and avoided other deleterious effects that would otherwise have been involved in converting these raw natural resources into usable building materials. Overall, the massive amount of material recovered and either reused or recycled from the old Science Center meant that given Middlebury College's decision for demolition, the project was carried out in an environ-

mentally conscious fashion. In fact, when a substantial bee colony was discovered in the building, T-Rex went so far as to “save” it and subsequently transport it to a beekeeper in Bristol.²⁶

There are many practical reasons for other institutions and organizations to recycle waste materials accumulated during demolition projects. There is very little reason *not* to recycle. There is a need to dispose of the debris in some manner anyway, and recycling keeps debris out of landfills and reduces the demand for raw materials. In 1999 the United States created two hundred and thirty million tons of municipal solid waste, averaging to 4.6 pounds per person per day, up from 2.7 in 1960.²⁷ These amounts, however, do *not* include construction or demolition debris, which, as we have seen, can contribute significantly to the waste stream. A large-scale movement toward construction and demolition recycling, then, has the potential to significantly decrease the waste stream —something of great benefit in light of the increasing trends in non-construction debris indicated above.

Economic variables also make it sensible to recycle despite inconsistent markets, because trucking costs, including the cost of trucking on air quality, can be reduced and some demolition materials can be sold for profit. Another economic incentive is the waiving of shipping fees. For example, the Addison County Solid Waste District charges thirty-three dollars and forty cents per ton of waste shipped out of the county to landfills or incinerators, but the entire fee will be waived if the material being shipped out is marked for recycling.²⁸

The unique project undertaken by Middlebury College and T-Rex changed the way in which the college sought to expand in this case. This strategy has two apparent benefits —first, while it did not employ an existing structure, it made use of already-occupied space rather than filling open space in another section of campus or sprawling beyond the current edge of campus. Second, approximately ninety-eight percent of the materials from the building were either reused or recycled, the benefits of which have already been discussed. While at first glance, this ninety-eight percent figure is quite impressive, the fact that many of these materials were not used locally and that reality that at this time the recycling and reuse of materials has more economic rather than environmental incentives perhaps cast this figure in a different light.

Notes

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IV. VIEWS FROM THE COLLEGE AND BEYOND: IMPACTS, INTERPRETATIONS, AND OPINIONS

Oren Frey and John Newman

“Viva science center,” “very impressive,” “stupendous,” “unbelievable,” “groovey [sic],” and “very cozy” are among the comments written in the guestbook from the April 19, 1969 dedication of Middlebury’s new Science Center.¹ The seventy-five thousand square foot, four million dollar building was symbolic of “Middlebury’s great step forward in science instruction” and represented “a massive commitment to first quality science education in a liberal arts college.”² Just over thirty years later, a press release by the College’s Office of Public Affairs suggests that the Science Center was “an architectural mistake since it opened in 1968.”³ Many disliked the building because of its stark profile which erected a barrier between the lower campus and adjacent neighborhoods. The widely held sentiment that it was an unattractive, functionally outdated, and outgrown building made it easy for college officials to make such a statement.

To be sure, it was an architectural creation that has in the past months offered the College an opportunity to test innovative new technologies in demolition and materials recovery. While Middlebury’s decision to recycle building materials is generally left unquestioned and is viewed in a positive light, many community members have mixed feelings about the College’s decision to demolish such a recently constructed building.

But there are also broader debates and broader issues at stake. In his *Walking History of Middlebury*, Professor Glenn Andres states, “the construction of this building altered the traditional relationship of the College to the village, for it necessitated closing Storrs Avenue, which had run along the lower edge of the front campus.”⁴ The College’s actions at the site of the old Science Center, both past and present, have affected not just Middlebury College students, faculty, and staff, but have had an impact on the lives and ideas of a much larger community. What does the grinding up of a building’s worth of concrete mean to neighbors, local leaders, and intellectuals? What does it say about the College’s priorities and its relationship with the Town of Middlebury?

Here we report on the opinions, experiences, and reflections of members of these groups, which we have divided into people who felt the impacts of this decision either directly or indirectly. We have also grouped opinions based on whether or not individuals had current associations with the College. Questions asked of interviewees focused on, but were not limited to, tangible impacts of demolition, the decision to demolish, perceived merits of the recycling element of demolition, and concerns about this sort of expansion. Consent forms signed by interviewees offered an option for anonymity, which has been protected when requested. In selecting people to talk to, we initially targeted individuals we knew were being affected or who would have opinions. Oftentimes our contacts offered suggestions of others with whom to speak. In this sense, our research methods involved a “snowball sampling” technique which did not produce comprehensive quantitative or statistically significant results, but rather resulted in an overly negative array of opinions. Despite these limitations, many of the views impressions of the people we talked to are worthy of note.

Rather than summarizing these views below, we felt it would be most effective to present individuals’ views as separate paraphrased narratives, so that their perspectives could be better framed within the context of their relationship to both the College and to this specific project. It is important to emphasize that within each of the following sections, the ideas presented are solely those of our interviewees, and do not necessarily reflect our convictions individually, or as a research group. This caveat holds true for all paraphrased comments, rhetorical questions, and musings in addition to direct quotations. Because of this, we recognize that some narratives may contain some factual inaccuracies and misinformed views. We welcome feedback on these matters for future versions or updates of this study.

DIRECTLY AFFECTED INDIVIDUALS

*Father Peter O'Leary, Father Denis Breton —
Assumption of the Blessed Virgin Mary*

St. Mary's Church is located directly across VT125 from the old Science Center and is, according to Breton, "an island [that] lies upon what is probably the [College's] most desired piece of real estate." While St. Mary's proximity to the construction site and the College at large makes it one of the more affected neighbors, neither Breton nor O'Leary expressed any grievances with the project's impacts on their lives. Breton and organist Kevin Parizo attended several open Middlebury town planning board meetings at which the project was discussed. They wrote letters to the college expressing their initial concerns, but found that the College and T-Rex "were both very respectful and very easy to work with." It was agreed that the church could directly notify T-Rex a day in advance of any funerals or weddings to ensure that there would not be disturbing background noise at these times, but the lack of weddings and funerals meant that the plan of notification and change in work schedules was rarely employed. The consensus seemed to be that "It was noisy, but not that bad." When the windows were open early in the fall in the church and at the parish's school, "a fair amount of dust" from the demolition accumulated inside, "but not a whole lot," and as temperatures dropped and windows closed, dust was no longer a problem. Overall interactions with the College on this matter were thought to be very positive in nature.

O'Leary commented that it "looks nicer to have it out of the way," but that to him it "seems kind of strange just to tear it all down just to build it back up." However, he added that the recycling of building materials seemed "like a good use of resources," acknowledging that "it's good that they [the College] thought of that instead of just being wasteful and throwing it away, which they could have done since they have enough money." Both men are relatively new to St. Mary's, and neither was sure why the College had decided to remove the building in the first place. Breton, who felt that the old Science Center was a "very charming structure," surmised that since the college had a variety of lots to choose from for a new library, this site must have been chosen for accessibility and aesthetic factors.

Their feelings about the future of the site are more disparate. Stressing the importance of strong church-

college relations and the need for give and take, Breton felt that they could continue to be "great neighbors" in the face of future progress and expansion. Father O'Leary's statement that the College's "big [new] science building ... looks a little out of place," and that "hopefully [the new library] won't take over too much," foreshadowed thoughts expressed later that Middlebury College's role in shaping the Town of Middlebury is perhaps too large already; many are questioning "who is running who [sic]."



View of the demolition site with St. Mary's Church in the left background, courtesy of Oren Frey

Alexandra (Alya) Baker, Professor of Russian Emeritus

When Alexandra Baker moved into her home on South Street in 1969, she never expected that the College-owned lot adjacent to her property would contain anything but overgrown trees and bushes. She grew to love the privacy of her tranquil patio and yard, and was thus quite taken aback and upset when she heard that the College planned to place two of the houses from Old Storrs Avenue in the lot immediately next door. Aware that the clearing of the lot would displace wildlife, she contacted Warren King of Otter Creek Audubon, who recorded sightings of thirty bird species on the lot in two mornings. However, the College did not find that a compelling reason to find a different site. She went on to find out that the college originally wanted to demolish the Old Storrs houses, but that for historical preservation reasons the Town had required that they be preserved and placed in suitable residential areas. When the consultant hired by the College advocated use of the lot next to her, she was given a feeling of powerlessness. "But what can you

do?” she asked rhetorically.

However, the College’s previous management of the land adjacent to her further displeased Baker. Soil and cement from the construction of Kenyon Arena had been dumped on the site and never properly graded, leaving a “big mess” that she and other neighbors found college officials unwilling to clean up. The College’s intent to begin a new project there without having ever finished the previous one was enough to compel her to contact an attorney, bringing immediate resolution to the matter of the dumped materials. To prepare the site for the new houses, eleven feet of fill was required. The College was originally going to use crushed old Science Center concrete for this purpose, but since it had conceded to clear and fill the property while Baker was abroad in September, this material was not yet available and other fill had to be obtained.

Though the old Science Center’s fate resulted in a less pretty view out her windows, Baker was “not particularly unhappy” to see it go since it was not “a very good or very nice building. But on the other hand,” she continued, “I think it’s amazing that it was here only for thirty years – and to spend all this money to destroy it, I know a lot of townspeople are upset about that.” Summarizing the views of some of her acquaintances, Baker said, “Although they all say that it’s an ugly building ... once it’s there it’s there, so what can you do about it? Many people thought it should be remodeled into a dorm or something else.” She understands the need for a new library, but hopes that it will not turn into another “monster” like Bicentennial Hall, and feels that while the plans appear to represent a building more attractive than the old Science Center, it’s hard to predict how the future building will work with its surroundings.

Baker does not have strong opinions with regard to the materials recovery process, reasoning that demolition would cost a lot of money regardless of the method employed. “What could they do, tear it down and haul it away and put it in a dump somewhere?” she reasoned, adding, “once you begin demolition, you have to deal with it somehow.” Despite her unpleasant experience, she believes the College is trying as best it can to incorporate neighborly concerns. While no one foresaw the College becoming what it is today, there’s a need for everyone to adjust and for the College to be accommodating, as further encroachment on its neighbors seems inevitable. She feels that townspeople should not be quick to criticize institutional growth

since the College offers so much to the community. In addition, her feeling is that the College does try to be environmentally conscious, but in cases like this some elements of the process “just don’t work.”



Storrs Avenue home being readied for move to South Street,
courtesy of Oren Frey

INDIRECTLY AFFECTED INDIVIDUALS (NO COLLEGE AFFILIATION)

Phyllis Armstrong, Attorney

Armstrong is both a Middlebury native and a Middlebury College alumnus who has little sympathy for her alma mater when its desires conflict with those of the Town. She was eager to share maps excerpted from the 1871 Beers Atlas of Addison County that illustrated historic land use around the site, along with zoning ordinances, town tax maps, and lists of historic buildings that were used in the planning process (see Appendix B). As a friend of Alya Baker and someone who suffered from municipal sewage facilities being placed on her family’s land, she is particularly sensitive to Baker’s concerns about the Storrs Avenue homes.

“I realize they’re trying to keep up with other colleges and universities,” Armstrong noted, but “the College is not a good neighbor,” she emphasized, citing the Atwater Commons project as evidence that the College “just seems to keep doing it and doing it.” She is afraid the new library “might be a greater eyesore” since, “the design of it is not in keeping with that part of the campus at all.” “Awful” and “terrible” were offered as descriptors. Though as a cardholder she would enjoy having the library close to town, she wonders why the College didn’t place the library on the

already-expanding western side of campus, given that the College “owns lots and lots of land there.” Moreover, she feels like “there was nothing wrong with the [Storrs] houses where they were.” The College could have at least moved them to some of its more distant property —such as the recently-purchased Lucier Farm —to minimize impacts on neighbors, but “what the College wants the College gets.” On a positive note, Armstrong added that the Town will benefit from taxation on houses that were previously exempt due to occupancy by students.

She had not heard of this sort of demolition before, but thinks the recycling process is probably a good thing. Yet it is hard for her to focus on positives: “I’m angry with the college because they’re trying to take over more and more of the downtown, and dangling this three million [dollar] carrot [to acquire the municipal building site] in front of the townspeople is not right.” While there’s “no sense” in additional expansion today, Armstrong makes the interesting point that construction of the old Science Center never should have happened either. Joseph Battell left a proviso in his will that the College was not to build further down the hill from the existing science building (Warner). Yet Middlebury took over the site of the independent PKT fraternity house on Old Storrs Ave (today’s Porter House) and built its science building anyway. Its actions were never questioned, and land in the Warren area was not taken from the College as conditions in the will directed. Armstrong pointed out that, since Battell specifically prohibited construction of a science building, the College’s present erection of a library on the site may be legitimate, but it is fascinating that we would not be recycling anything today if it someone had paid attention to Joseph Battell’s will thirty years ago.⁵ For excerpts from Battell’s will, please refer to Appendix C.

Kevin Parizo, St. Mary’s Musical Director and Organist

As someone who has lived in Middlebury for his entire life and engaged in civic duty by serving on the Middlebury Select Board, Kevin Parizo has a long-reaching perspective of the events on the corner of Franklin and Storrs. He recalls the high degree of conflict and animosity that arose when the old Science Center was originally constructed. Although the relo-

cation of Old Storrs Avenue houses may seem unprecedented, it was just over thirty years ago that residential homes on Storrs Avenue were relocated to Porter Field Road to clear the ground for the construction of the old Science Center. Even with the buildings today known as Porter House and Hathaway House long ago removed from the area, Parizo has fond memories of Storrs Ave as a peaceful residential street. So for the building to “come back down thirty years later [is] quite intriguing” for him.

The loss of the science building was “not a tragedy” since aesthetically it never fit into the look of the campus; the real tragedy was to “ruin the open, unobstructed view of Old Stone Row” in the first place.⁶ Will the new building better fit the size and nature of the surrounding community? “Who knows?” Parizo replies, noting that the plans for the library call for an “obviously impressive” and “more aesthetically attractive” building. “The College must look towards its future needs and it is.” The chief concern for him is the continued loss of residential streets as the college buys up more houses; only one home not yet owned by the school remains on Franklin Street. Consequently, concerns that have been voiced about increased light pollution —glare that makes the night sky less dark — from the new library will likely prove insignificant for neighbors, as the school will primarily be over-lighting its own property. He echoed the sentiments of others in stressing the need for the school to resolve its perpetual student parking dilemmas so that expansion does not result in parked cars intruding onto residential streets.

Parizo, who had not heard about the phenomena of building recycling anywhere else in Vermont, is quick to compliment the College on its plans to re-use materials, stating that this ecological bonus is “great.” He is “very interested” in the actual decision to demolish the building, and though he is “not very aware of the details,” he suspects the College must have investigated all possibilities for alternative uses of the building, including using it as a dorm. Sympathizing with the College, he concurred that it “doesn’t make sense to sink tons of money into a building that’s not functional.” Overall, Parizo accepted the College’s actions over the course of this project, but was definitely wary of the College’s ability to dramatically change its surroundings over the long-term.



Clear view of Old Stone Row from where the old Science Center once stood, courtesy of Oren Frey

Shelly and Ray Hudson, South Gorham Lane residents

The Hudsons have been living in the College's shadow, literally, ever since Bicentennial Hall was constructed, so they are particularly sensitive to matters involving the school's treatment of its immediate neighbors. Having resigned themselves to the fact that Gorham Lane is a "neighborhood changed forever," they are now fearful of what the College has in store for those near the site of the old Science Center. Shelly was quoted in the Addison Independent as saying, "To have this feudal castle [Bicentennial Hall] on one side of the campus and a UFO [new library] on the other worries me because these buildings shed a lot of light and make an unbearable amount of noise."

Gwathmey Siegel & Associates, the architects of the new library, have incorporated 6' x 6' "punches" of windows into building plans. These may look like nail-holes on the plans, the Hudsons warn, but in reality they will constitute huge panes of glass that will be considerably larger than most windows in Bicentennial Hall. In contrast, the old Science Center, which was dark enough to be "scary when ascending the outer stairwell at night," certainly did not emit much light. Is this new theme of emitting high amounts of light onto the periphery of the campus meant to represent a beacon of pride for the college and its architects? Moreover, though ventilation from the new library is planned to be via the roof, Ray is confident the noise will disperse considerably and that there will be little if any buffer between the building and neighbors.

Certainly, attest the Hudsons, the old Science Center was ugly, particularly the view of its northern

"sixties style" numbered yellow stairwell, but it was a less obtrusive building than the library is sure to be and it was not a light and noise polluter; it was "an eyesore but it didn't leap out at you." The overly modern library, with its arched shape and windows, will be as out of place in the quaint "Oz-like" village of Middlebury as Bicentennial "Godzilla" Hall. Shelly Hudson does not hesitate to say that the College shows "no goodwill" in continually dwarfing its neighbors with "huge monstrosities" and making them feel insignificant. She is not sympathetic to friends who tell her things would be worse if she lived in Cambridge. The "College hopes people won't unite —and they haven't —and they'll just get it [demolition and construction] done in time before there's an uprising."

It's a high priority of the College to preserve open space in the middle of campus, and the result is pushing new growth onto those adjacent to it. Shelly finds it infuriating that these buildings look pretty when approached from other parts of campus, but that they loom larger for and are vented toward neighbors. It seems equally morally unjustifiable that the College "throws money all around in the guise of recycling it [the old Science Center]." The entire process is very wasteful, but "they can just do what they want to do."

Fred Dunnington, Middlebury Town Planner

As someone who has been involved in all stages of the decision making process involving the future of Middlebury College's library and the old Science Center site, Fred Dunnington is quite familiar with both the college and town views on this project and campus expansion in general. He notes that one can look at the entire process from several different angles. Through a cynical lens, it could be effectively claimed that the College's decision to embark on the recycling effort was motivated solely by economic factors. Given the cost of waste hauling and shipping, perhaps saving money was the chief pragmatic concern. The College's use of the term "deconstruction" is misleading, since the vast majority of materials are *not* being carefully dismantled and put back together elsewhere. Instead, the College is demolishing a building and is simply faced with the need to dispose of large quantities of material in the most logical and economically feasible way possible.

Or, with a more positive outlook, one could say that despite numerous concerns with the appearance of the planned new library, the College succeeded in cre-

ating a building with “functionally great design” and in “pushing the envelope to build a large building close to town.” Deciding to place this building of primary importance at the Storrs and Franklin site offered the College a win-win situation. Since college officials would argue that a library is “an intellectual center and that’s what we’re all about,” they were morally justified in their desire to rid themselves of the much-hated old Science Center. “They can justify blowing up any mistake to pave way for a new intellectual hub,” Dunnington asserted. Following earlier plans, Middlebury could have sunken forty million dollars into Starr Library and still been left with an ugly science center. With the current plan though, they are managing to end up with a new library and the vacated Starr building only, which can be more easily adapted into something that looks good.

Was destroying the old Science Center really justified from an objective viewpoint? Dunnington agrees that one would have had to assume the future deterioration of concrete and increasing instability, but by no means feels that there was anything structurally wrong with the building. The College’s abandonment of its plan to use the old Science Center as a temporary library because it could not withstand the weight of stacks was undoubtedly guided by the ulterior motives described above. His feelings are that: “Maybe, if they had books piled eight feet tall, piled to the ceiling so that you had to access them with a ladder, then *maybe* the weight of the paper might have been an issue,” but that otherwise it “was in all reality not a realistic concern.” He predicted that notifying the building’s original engineers that it was torn down on the basis of its inability to hold books would make their blood boil and bring their hearts into their throats. Perhaps the College should have also considered that the amount of printed materials is guaranteed to go down in the future. Dunnington imagines that space needs for new acquisitions were overestimated since digital access is becoming so prevalent. Instead of demolishing the old Science Center, perhaps the College could have further decentralized its library collection to better serve departmental needs and used the building as one of several libraries.⁷ While the Town of Middlebury would not have permitted use of the building as a dorm, it certainly would have approved transforming it into a permanent library.

While the College managed to fulfill its own goals with the scheme that was ultimately chosen, negotiations with the Town resulted in various changes to plans in an effort to minimize the project’s adverse effects on residents. In accordance with the Middlebury Town Plan, a significant concession made by the College involved the futures of the Old Storrs houses it had decided to relocate. Initially, the College hoped to expand its campus by placing the homes on South Main Street between Starr Library and the future Storrs Avenue entrance, but since citizens were already disturbed by the amount of houses the College had overtaken in the neighborhood surrounding the lower campus throughout the nineties, it was determined that the houses should instead go to sites where they would better blend with non-college houses. The key proviso was that rather than filling the houses with transient residents (students) who are “destructive to neighborhoods,” they must be occupied by families who will help to “recreate neighborhood integrity.” Dunnington does feel as though Middlebury took advantage of the Act 250 process by claiming that the Town Planning Commission had *required* the moving the houses in the first place, when in fact it had only been offered as a passing suggestion. By making part of their grand plan out to be the wishes of the community and not of the school, the College likely increased its chances of moving quickly through the stages of permitting.

Since the College does occupy so much of the space surrounding the construction site (some houses are even leased without occupants), it has likely been spared much of the opposition it would have otherwise faced. With only five or six *family* dwellings in close proximity to the site, there are few people to complain. Yet that certainly does not imply that there have not been objections to the design of the new library building. Dunnington finds the conformity of the structure to both the College’s own Master Plan and the Town Plan questionable. Though it will appear to have a lower profile, the library will only be fifteen feet shorter than the old Science Center was. Though it seems to do a better job of blending with its surroundings, it will still loom large for pedestrians, with massive windows that are out of scale and do not further town guidelines for maintaining “human scale” façades. The College decided the Old Storrs homes had to be eliminated from the site from the outset principally so that

there would be less juxtaposition of scale; there would be fewer surrounding structures to measure the library against.

The projection of the front of the library into the front quad represents a historical violation of College planning, and its shape will also make the new Storrs Avenue curve further into town. Although Middlebury requested its architect attempt to make the library “look like a traditional campus building,” a firm such as Gwathmey Siegel & Associates is primarily interested in creating unique “showpiece” buildings that make bold statements, what Dunnington refers to as “icons of style and art.” This explains the curved front of the building (also a key feature of the draft of a Starr Library expansion), which is intended to suggest elements of classicism. Rather than building within the guidelines of its Master Plan, the College made major revisions to the 1998 Master Plan to accommodate this project. The four “landmark buildings,” Chateau, Mead Chapel, Old Chapel, and Twilight, buildings with elements which future construction is to model itself after, are now joined by the Center for the Arts and Bicentennial Hall, allowing the College much more leeway in erecting modern structures on campus.

Prestigious architectural firms attest that “colleges should lead society in modern architecture,” and they, together with the Trustees, President, donors and larger departments have been the key forces in the recent shaping of Middlebury’s campus. The vast majority of “modern buildings” are not appreciated in their time, but can be likened to risky gambles taken by institutions. Looking into the future of its to-be-built modern showpiece, then, Middlebury had best hope it fares on the fortunate side of Dunnington’s view that, “if you’re lucky twenty years down the line people will have grown to like it, otherwise you tear it down like the old Science Center.”

Sepp (Josef) Firnkas, Old Science Center Structural Engineer

Firnkas worked together with Walter Gropius’ now defunct architectural firm, The Architects Collaborative, which designed buildings such as New York’s Pan Am / MetLife building (1958) and Washington’s American Institute of Architects Headquarters (1973), in engineering the old Science Center in the late 1960s.⁸ Structural engineers ensure that a building is built strong to withstand time, weather, and earthquakes by grounding it with a good foundation and well-braced walls. “Form follows function” is the general rule for engineers like the now retired Firnkas, who also

designed the US Air hangar at Logan Airport. Though he was unavailable for extended conversation, his response to the news of the old Science Center’s demise was that it had “nothing to do with the building.” It was “a very good building” and its demolition “had to do with developers” (i.e., college planners) and their desires only.



Rendering of the Science Center
The Architects Collaborative
College Archives

INDIRECTLY AFFECTED INDIVIDUALS (AFFILIATED WITH COLLEGE)

P. Frank Winkler, Professor of Physics

Had T-Rex not been awarded the job, Frank Winkler “would have loved to push a plunger to make it [the old Science Center] blow up.” Though he had many good times in the old Science Center over the years, he is “absolutely delighted” to see it go, because it was “a bad building in a bad place,” a building that erected a wall between the town and college. Winkler makes the interesting point that the old Science Center was originally envisioned as one of a group of buildings; an identical building to the south was to be linked to the old Science Center with a three-story science library that was never built. It was because of this grand scheme that the second and third floors of the old Science Center had “doors to nowhere” on the southern side. Yet even as a single structure, the old building represented a major space expansion for the sciences, and seemed vast at a time when the College had an enrollment of around fifteen hundred students.

With all the dreary bare concrete walls left exposed (paint only came in later years), the old Science Center was always a “fairly bleak building,” and Winkler found it “a little depressing when you first came in.” One of the perceived advantages of the old Science Center was that it would have the virtue of being a very low maintenance building. However, it faced real spatial limitations which became more and more problematic over time. Not only did physical space become a problem as the number of students and faculty increased, but the flexibility needed in arranging teaching areas for the highly evolving science fields was often impossible. While Bicentennial Hall labs can be easily reconfigured, every enlargement or reconfiguration to the old Science Center that accompanied major changes in the curriculum required tearing down cinder block walls. In 1969, “not even Al Gore had envisioned the internet,” resulting in perpetual pounding on walls and drilling holes as frequent changes to the building’s electrics and information systems were necessary. Furthermore, since for the first ten years or so of the building’s life the detached science library was still being anticipated, all science books and journals were stored in open areas on the second through fourth floors that had been intended as study areas. This system proved impractical since there was no control over book circulation. The idea later arose to drop a science library into the top of the old Science Center by creating a tower for the building. While this opened up study areas and allowed better control over books, it also eliminated the bright atmosphere of the fourth floor with its double-high sky-lighted ceilings. In addition, fifty percent of the science collection still had to be stored in Starr Library, and the science library had both poor temperature regulation and cramped quarters, narrow aisles, and low six-foot two-inch ceilings thought reminiscent of a submarine.

With the old Science Center gone, Winkler finds the restored open view to be beautiful and appreciates how the area now harks back to the era of the historic Storrs Avenue. “For my money, I wouldn’t build a library there either,” he concedes, but he feels as though the building’s placement will be significantly enough to the south to improve sightlines. The recycling process that has been undertaken is “terrific” and “admirable,” and Winkler really respects the College’s commitment to being a responsible environmental citizen, which he thinks is the “real thing.” Worries from town are legitimate; “all American colleges suffer some town/gown divide,” and while the College on the

whole has been a good citizen of the community, he can not blame townspeople for ill feelings. Middlebury “would be much impoverished without the College, but that doesn’t mean the school should dictate all things.” He thinks that sometimes some citizens may be too quick to accuse the college of highhanded action, but that there’s also room for a bit more sensitivity on the school’s part.

Faculty member

Another member of the faculty who had experience working in the old Science Center was able to provide insight into additional quirks and design problems of the building. An air input system incorporating re-circulation for ambient cooling was never installed, so that air was always supplied to the building at the outside temperature, which often made summer work in the Center uncomfortably warm. Air conditioning was never installed since all the windows opened and had metal on metal seals, which didn’t close tightly. And since the old Science Center was kept at negative pressure because of all the lab hoods and vents it contained, the result was that air was sucked in through the poorly sealing windows, making the building interior dirty and drafty. When the windows were wide open during the fall and spring, large quantities of pollen and dust came in, making work very hard for those with allergies.

The building’s cinder blocks, rather than being of an ordinary grade, were fashioned of Italian pumice that was meant to withstand heat and survive chemical fires intact. Unfortunately, this pumice also shed large amounts of white dust, which was an annoyance until the walls were eventually sealed to solve the problem. Another issue, though corrected in the nineties, was that the building’s exhaust vent was located very close to its central air intake ducts, which sometimes led to horrible odors being delivered to interior hallways. Sensitive laboratory equipment generally cannot withstand temperatures in excess of 80°F, and the overloading of labs with heat sources coupled with the inadequate air circulation system put limits on the sort of machines that could work in the building’s environs. In short, The Architects Collaborative was not accustomed to designing science buildings.

And, in the eyes of this professor, even with its expensive solid oak doors and casework and local limestone that was loaded with plant and arthropod fossils, the old Science Center looked “forbidding,” a “big, dark gray” mass that lacked interior paint for unclear

reasons. Beautiful colored banners were in place for the dedication, but were removed the next day and additional color was only found in the “funny yellow stairwell numbers” that were added in the eighties. Along with functionality, buildings should look good because people work in them. The structure’s lack of visual appeal, combined with these other grievances, led this individual to the conclusion that demolition “couldn’t have happened to a better building, thirty years too late.”

Given that demolition was indeed the path taken, this faculty member sees the recycling component as being “a great idea” for several reasons. Despite the project’s substantial price tag, “if the College is truthful about what it’s doing and gets PR, it’s worth the cost.” Indeed, a recent departmentally endowed lecturer who came to Middlebury had seen a photo of the demolition site in the *New York Times*, implying that news of the project has already spread out of state and is thus paying for itself. This individual did feel, though, that “whether the rubble is ground up on site or deposited in a landfill” seems like “smoke and mirrors.” Is it even necessary to crush the concrete at all? Who cares? The hoopla about the future use of the material onsite seems like much ado about nothing, and is perhaps being overly used to the College’s advantage. Regarding Middlebury’s donations of much of the old building’s contents to local public schools, the College is “just being a good citizen.” This is really not an extraordinary thing to do, but “someone is making a big deal out of it, and that’s good.” Another perceived bonus of the eco-guided demolition is that the process has been “remarkably not noisy.” Working carefully has resulted in relative silence, and this could also be considered worth the extra costs incurred.

The ideal situation would be for the site to remain clear so that a sightline between Twilight Hall and Old Chapel is maintained, but this professor does not see the new library as posing a major problem. Perhaps many people have voiced objections to new building projects such as the library since “Vermont tends to attract people who want to live in the twenty-first century but have nineteenth century surroundings.” Rather than the “visual bridging” of the town and college that Middlebury is suggesting the new library will offer, the true way to bridge the gap between factions and satisfy any opponents would be for the College to allow townspeople equal use privileges to library resources.

Jonathan Maziarz

Having graduated from Middlebury as a biology major eight years ago, Maziarz was quite surprised when he encountered a *Middlebury Campus* article on the old Science Center’s fate. Noting that such “things don’t make it into the alumni magazine until a year or two after they happen,” he was so overcome with nostalgia for the building that he sent a letter to the *Campus* expressing this sentiment some weeks later. What had disturbed him about the initial article was that the old Science Center was entirely “maligned as something that didn’t fit in with college.” Though he specified the good studying environment of the old building and the science library in particular, he admits that with unsatisfactory features such as undersized lecture halls there weren’t a lot of great things about the building from a practical perspective. Yet though it seemed to be “twenty years out of date when [he] was there” in the early nineties, it was by no means lacking charm and he along with many friends he’s spoken with will definitely miss it.

Despite his sadness, Maziarz thinks that reusing parts of the building is definitely better than just disposing of these materials by traditional means. But from an energy perspective, the decision to demolish and rebuild is “probably a loser” when you consider factors such as what must go into the making of new concrete. However, he qualifies, if you accept the college’s decision that the building had to come down, “they’re doing the right thing.” Should Middlebury have sought other uses of the building with greater vigor? In Maziarz’s Middlebury-shaped mind, if the College didn’t think it could (functionally) serve as administrative offices or a departmental building, then what the College is doing (demolition) is okay. He would contest, though, that if the decision was made purely on aesthetics, with administrators saying, “oh, that’s an ugly building,” then it’s a questionable decision, regardless of the old Science Center having always been “a zero in terms of aesthetics.” The complete remodeling of Hadley, Milliken, Kelly, and Lang Halls, which transformed them from “pretty ugly” structures of a similar architectural genre as the old Science Center to what they are today during Maziarz’s years here illustrates that the College is willing to “sink a lot of money” into projects that improve its “highly valued” aesthetics.



Demolition of Science Center roof
courtesy of Carlos Lopez Hollis

Pardon Tillinghast

Pardon Tillinghast, a retired history professor and Adirondack View resident, presented opinions from both the Middlebury College and town citizen ends. Tillinghast noted first that he found the demolition of the Science Center to be a bit “silly” during a time when general space seems to be at a premium on campus. However, the retired faculty member was pleased that Middlebury had adopted a green approach to the project, and that if it was deemed necessary for the school, the recycling efforts were a step in the right direction. He praised College President John McCardell for his “attitudes,” and the fact that “he takes his work very seriously.” Tillinghast recalled his days of teaching in the thirty-year old building, labeling it “not fun to work in.” His complaints were focused on a lack of air-flow, with “no windows and no air conditioning” creating a stifling atmosphere within its concrete walls.

The final use for the tract of land previously occupied by the Science Center was what interested Tillinghast the most. Middlebury’s new library is a fitting representation of the long term academic goals of the college, for Tillinghast looks at Starr Library as “inadequate for what librarians hope to do in the future.” Despite his believing that a new facility is necessary, the Adirondack View resident voiced concerns about the potential disruption that may result from its construction.

Faculty member

Some within the College have a far more critical view. One faculty member doubts the legitimacy of any project-related claims of environmental awareness, referring to the process at the old Science Center as wasteful “recycling nonsense,” especially when one takes into account the quality of the old Science Center’s materials. With beautiful exterior limestone from the now-exhausted Panton Stone Quarries encased within a contemporary mortar that was stronger than the stone itself, it proved impossible to salvage the stone intact for use in another building. In the mind of this professor, the crushing of some of this prized local limestone is by no means “recycling,” it is destruction.

Concurring that the building was ugly, built with the notion that “scientists don’t need colors,” they find that to be no excuse for what has transpired. The College’s argument that the building was structurally unsound was far from the truth: this individual would like to know “What architect told them it couldn’t support the weight of books?” Certainly its frame was far superior in strength to the cheap and poorly constructed cinderblock buildings comprising the Ross Commons addition. “If you have a good thing, you find a way of using it.” Great art and buildings are created not when one scraps a project, but when one takes a flawed piece, an eyesore, and turns it into a masterpiece. Once interior walls were knocked down, why didn’t the College attempt the easy conversion of the building’s open skeleton into residential space, student storage, or hotly demanded classroom space, all of which would have put less of a weight burden on it than book storage? Even if the concrete in the old Science Center needed further reinforcement for alternative uses, it would have been cheaper than the demolition process. It would have even been better to leave the building - created by the firm of Walter Gropius, the “Frank Lloyd Wright” of industrial architecture - vacant than to engage in such awful destruction.

Citing the construction of the Center for Fine Arts as a result of the neglect of existing infrastructure (earlier plans instead called for Johnson and Wright to be refurbished and linked to create a multipurpose arts center), they conclude that the College chooses to solve its problems with a “just build more” mentality. No one considers the base question of the need to exploit yet un-mined and unprocessed natural resources in order to support such extravagances as the planned new library.

Is sending old Science Center metals to foreign countries really doing any good, or is it simply representative of wider social problems? This professor offered the parallel example of people who purchase economy cars to make themselves feel like they're doing the planet good. They'll drive these vehicles for 200,000 miles, but never grow sentimentally attached to them, so that it will be painless to dispose of them and buy new ones, creating a huge demand for virgin metals that is overshadowed by these consumers' impressions that they are acting as responsible earth stewards by getting good gas mileage. In this member of the faculty's view, it would be one thing if the College were simply tearing down the old Science Center, but the fact that it is using its own wastefulness to claim environmental responsibility is infuriating. Such double-standards are not new: Middlebury "recycled" its swimming pool into The Grille, but trimmed its window frames with rainforest mahogany in the process. True recycling would have involved locally remarketing the concrete from the old Science Center for new building projects, selling it concrete block by concrete block. Instead, amidst a cloud of cough-inducing silica dust, the majority of the structure was crushed and laid to rest on site, failing to complete a full recycling loop.

Why was it so important that the College clear the old Science Center out of the way for a new library? Because Middlebury's trustees, a meritocracy despite the fact that the majority of them have never built a building or mixed a batch of mortar themselves, are eager to pursue the vision of further turning the Middlebury College campus into the symbolic church of a strongly reinforced collective college identity. With the new library positioned in line with the College's chapels, the chief administrators of this Middlebury religion will be ever so nicely positioned physically between God at Mead Chapel and "the thinkers" down the hill.

CONCLUSIONS

Some readers may find themselves taken aback by some of the ideas conveyed in the preceding interviews. As students who continue to be somewhat enamored with the concept of recycling an entire building, we were at first surprised by the number of critical opinions that were expressed in some interviews. Are these ideas actually representative of the thoughts of the wider community? To create a lively collection of voices, we originally targeted for inter-

views some individuals who were known to be highly opinionated on the demolition and recycling process. We allowed our pool of contributors to expand by taking suggestions from interviewees about others that might be able to share interesting views. This "snowball sampling" method may have resulted in a biased and overly negative array of opinions as we pursued the opinions of certain groups — such as vocal townspeople who had already publicly voiced their concerns — more than those of others.

A more random sampling of a larger body of residents, professors, and students may have yielded very different results. However, it is worth noting that some individuals who we thought would be bothered by the project instead had positive experiences with it. At St. Mary's, Peter O'Leary and Denis Breton were very pleased that the College had honored their requests to limit noise during church ceremonies. Would they still view the College favorably if they had actually been faced with many weddings and funerals this fall and put T-Rex's promise to the test?

During the interviews we conducted, several common themes surfaced. Though some felt as though the new library may not be a substantial improvement in terms of aesthetics, an overwhelming distaste for the now-leveled old Science Center resulted in most people's approval of the decision to remove it. Clearly, though, some believe that reuse options should have been further pursued and that deconstruction was not justified by need in this case. We did find it alarming that many immediate neighbors had minimal understanding of the College's decision-making process that led to this outcome. Perhaps the deconstruction should have been prefaced with a greater effort at educating the community about the project's motivations — something that other institutions contemplating such projects should take into consideration.

Community views of College projects like this almost always seem to be tied to more general perceptions of the role of the College within the context of the Town, and it becomes impossible to separate present institutional actions from past actions. For example, Alya Baker would likely have been more receptive to the College's house moving plans had her earlier concerns about College land use not been disregarded for several years. With this in mind, the College can only strive to further incorporate community input into future projects in order to maintain a successful relationship with town residents.

While there were divides on the broader issues

such as whether more reuse options should have been pursued or the design of the new library, there was widespread agreement that Middlebury's decision to recycle as much material as possible (once the decision to remove the old Science Center was made) was the most sustainable and responsible course of action. The widespread agreement from the public on this point is of note, because it is on this point that our group is still divided.

Notes

¹ *Science Center Dedication Guestbook*, (1969), available from Middlebury College's Starr Library Building Files Archives.

² "Overview of Science Center Features and Resources," available from Middlebury College's Starr Library Building Files Archives.

³ Middlebury College Office of Public Affairs, "What's in the Recycling Bin at Middlebury College? The Old Science Center," available from <http://www.middlebury.edu/%7Epubaff/press2001/latc1.html>, Internet.

⁴ Glenn M Andres, *A Walking History of Middlebury* (Middlebury : Middlebury College Press, 1975), 61.

⁵ *Joseph Battell's Will*, Middlebury Land Records Book 38, p.38, available from the Town Clerk's Office.

⁶ Old Stone Row, comprised of Starr Hall, Painter Hall, and Old Chapel, once constituted the entirety of the Middlebury College campus. Painter is the oldest extant college building in Vermont. The much beloved image of Old Stone Row was recently featured on a United States Postal Service postal card.

⁷ Dunnington implies that in addition to having a "Science Library" and "Music Library," Middlebury could have created decentralized libraries specializing in foreign languages, literature, or the like.

⁸ "TAC – Great Buildings Online," available from <http://www.GreatBuildings.com/architects/TAC.html>; Internet.

CONCLUSIONS

Middlebury College, in choosing to demolish and recycle the old Science Center and replace it with a new flagship library, has participated in setting a standard in future global construction patterns. The College has, with the help of many, transformed an existing structure into a supply of raw materials and thereby recycled the physical edifice itself. Moreover, by constructing this new library on a previously occupied tract of land, Middlebury has conserved its undeveloped areas and thereby recycled space itself. In this sense, the College has succeeded in performing the most basic of environmentally conscious tasks — Middlebury has reused.

Has Middlebury College truly acted within green parameters? Close examination of this issue has yielded a range of possible answers, none of them definitive, but all of them fruitful for further investigation. With ninety-eight percent of the structural material of the Science Center recycled and routed throughout the globe, Middlebury College has obviously worked to conserve resources and reuse all that can be reused. However, fuel, work-hours, and countless other renewable and non-renewable resources were spent in the process of conservation and the validity of this ninety-eight percent figure comes into question. Taken as an issue of cost/benefit analysis, if recycling one hundred cubic yards of crushed concrete requires burning twenty gallons of diesel fuel, two men attending a given piece of equipment, and causes one hour of noise pollution within a two mile radius, is the benefit of recycling this concrete worth the cost it necessitates? Does the claim that ninety-eight percent of a building has been recycled become false when one considers that unnecessary resource expenditure may have occurred as a result of the more detailed and painstaking process of "recycle-demolition"? Middlebury College contracted T-Rex Demolition to complete the task for a cost greater than the amount needed to perform standard demolition on a building the size of the old Science Center. The New Hampshire-based company, by nature of its precision, utilizes highly specialized equipment, equipment that costs more to build and more to purchase. Some might say, that monetary resources were expended in excess, and perhaps unnecessarily. The structural recycling process, by virtue of the fact that it is precise and more time consuming, simply requires more fuel than a standard demolition that might take

half the time. Additionally, the salvaged materials that require more sophisticated processing need to be shipped, often over great distances, in order to undergo that refinement. This shipping requires fuel consumption. Diesel fuel and gasoline, two vital and nonrenewable fossil fuel derivatives, were expended in this process, some might argue to excess. With precision comes qualification, and T-Rex Demolition employs highly skilled individuals in the field, individuals who require higher salaries for their abilities and an increased level of insurance protection and immediate physical protection. Because of the time consuming nature of recycling demolition, these workers also needed housing near the site, transportation in and around the site, and food. In terms of the employees required to carry out this specific job, multiple resources were expended.

In our research we have questioned not only whether Middlebury College has acted within the parameters of what is considered environmentally sound overall, but also whether the school has acted within appropriate social parameters: the limits of the immediate community. Residents directly adjacent to the site mentioned that the entire process was not severely affecting them, while others complained about anything from visual and auditory disruption to dirty windows. Individuals whose proximity to the project was distant had major complaints, while business owners a thousand feet away from the site noted no change. Where does this leave the community? Some members are unaffected, others extremely upset, yet all seem to agree on one particular issue —the question of whether or not this entire process was necessary. Many felt it an unnecessary project simply because the old Science Center seemed perfectly viable, able to be transformed into a useful space to fit the changing needs of the College. Others felt it was an unnecessary flex of Middlebury's pecuniary muscles, that the College has banked such a large amount of money over the years and needs to find something to spend it on. Can any community of competing voices be uniformly satisfied with a project such as this?

Expending resources in an attempt to recycle is contradictory, yet inevitable. The inevitability arises because it requires resources both to carry out the recycling and transport the materials to be recycled, and it requires specific, time consuming, and precise

labor. This is the challenge inherent in any recycling effort —the unclear boundary between the amount spent and the amount saved. If one ton of material is recycled from a project, but one ton of another material or group of materials is spent, has anything been saved, conserved, or gained? And while recycling makes economic sense when compared solely to the cost of land-filling, when other costs are considered economic disincentives arise. The key component to perfecting the model then involves reducing the expenditure of resources, across the board, in any recycling effort. Creating stronger markets and economic incentives to not only recycle and reuse materials, but also to do so as *locally* as possible may do the most to lower these expenditures. Fundamental changes are needed in order to make such emphasis on “the local” a reality and this is perhaps the greatest issue that needs to be addressed, both for this specific project and projects globally, for right now global priorities and markets dominate local situations.

How then can we make recycling both environmentally and economically beneficial? In light of the resource expenditure involved with shipping and processing materials to be recycled, consider what would happen if the means of processing these materials were closer to a site —fewer resources are required to carry a recycle demolition project to completion. The solution looks far simpler on paper than in action, but resource expenditure would be greatly decreased if, once again, there were economic incentives to make recycling a further reaching practice. Having more facilities that recycled a wide range of materials and a greater number of companies that provided structural recycling services would greatly diminish the resource-impact we have been discussing here. Our proposal here reverts back to the first concern, for it is necessary that recycling becomes less expensive before it is going to be locally accessible across this nation and around the globe.

The resource question that plagues any theoretical benefits of the recycling process has solutions, hypothetical as they may be. One can examine this situation at Middlebury College and see that the issues and problems noted in the process can be solved if significant change can occur in a number of arenas. The questions concerning the cultural impact of such a project are somewhat different from the matter of resource use *per se*, and it is here that Middlebury garners its praise. The style of demolition practiced by T-Rex and thus employed by Middlebury College is a quiet and unobtrusive one. Rather than swinging at the old Science

Center with a wrecking ball, caring little about the noise, dust, debris, and danger to local residents, Middlebury College ensured that the thirty year-old building be dismantled carefully and in a community-friendly manner. Despite the dismay expressed by some of those residents directly adjacent to the demolition project, many were unaffected by the process. Complaints were lodged more on the grounds of what was to be placed on the tract of freed land previously occupied by the building and not on the impacts of the clearing project itself. Middlebury has discovered something very important in demolishing the old Science Center in this fashion —that even if the recycling efforts in this situation are hindered by kinks in the process of recycling overall, the style of demolition required to perform that recycling is the style that has the least impact on the community at large.

Given Middlebury College’s efforts to recycle all that could be in the case of the old Science Center, and its success in maintaining as low a profile as possible in order to keep from disrupting the community, is the College an ideal model for a process such as this? The authors were divided on this issue, divided as to whether or not Middlebury deserves credit for its recycling efforts, and whether or not those efforts, in the end, were truly benefiting the environment as a whole. However, one point was resoundingly agreed upon: Middlebury has taken a step forward, shown the insight and ingenuity that will assist in paving the new road to more environmentally safe practices, both in construction and demolition.

For other institutions seeking to expand, perhaps demolishing existing buildings in the process, we would like to highlight the importance of involving the public at all stages of the process. For new construction, recycled materials should be the preferential building materials in order to decrease the construction industry’s demand on raw natural resources. For razing existing buildings, materials should be flagged for reuse or recycling and be utilized or processed as locally as possible.

Challenges to effective recycling, both in its cost effectiveness and its local scope, are hurdles to be overcome in the future. With the greater incidence of efforts comparable to that of Middlebury College’s, those hurdles will be overcome. The processes involved in this situation are inspiring signs of progress, and both the positive and negative aspects highlighted in this demolition case study will aid in the future refinement of structural recycling.

APPENDIX A

Selected Excerpts from the “Middlebury College Construction and Demolition Waste Management Best Practices” document.

“The following Best Practices are designed as directives for Construction and Demolition Contractors working for Middlebury College as well as for the staff of the college. These Best Practices ensure that hazardous and non-hazardous waste generated from demolition and construction of buildings on the Middlebury College Campus are managed to reflect the commitments outlined below by the Middlebury College Board of Trustees...

...The following practices are intended to provide an overall framework for Construction & Demolition (C&D) waste management at Middlebury College. Individual projects will require specific directives regarding waste material. These specifics will be provided by the college to the contractor on a project by project basis. These specifics will be established prior to the bidding process and will be included in project specifications as well as in contracts with general contractors and sub-contractors. All contractor will be expected to uphold this commitment to waste management to support the college’s overall mission in this area.

Practice 1 (if necessary): Pre-Demolition Audit

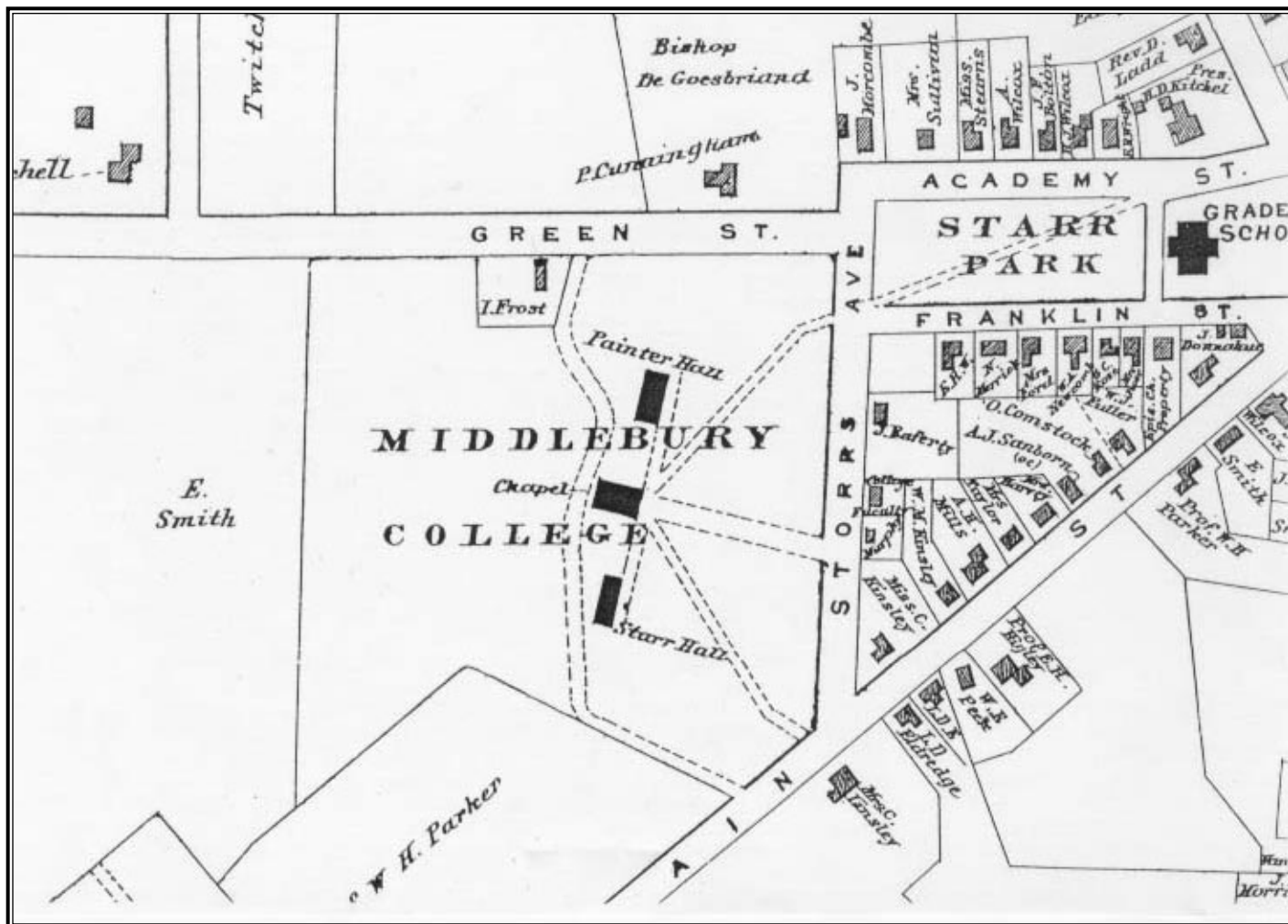
An Audit will be conducted by staff of the college (and a hired contractor if necessary) prior to any demolition project. All materials within a site will be documented by both location (floor plan) and quantities. It will be determined through the audit whether any materials may be reused by architecture salvage operations, the college or private citizens. A walk through inspection will include someone with “salvage/reuse” expertise who understands the value and market for architectural and other salvage materials. At this time, it is necessary to assess the need for a hazardous waste abatement plan. If a plan is determined to be necessary, the section on hazardous waste in this document lays out the best practices for hazardous waste abatement.

The following questions will be used as a step-by-step guide for the pre-demolition audit. A plan will then be approved by college staff and communicated to all contractors.

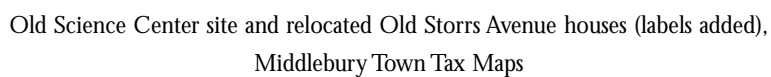
- What can be re-used (reclaimed) right on site for new construction, i.e. asphalt, glass, landscaping materials?
- Are there items of value to community, staff, alumni?
- Are there items (furniture, fixtures, moldings, mechanical equipment, etc.) which have immediate value to a secondary market?
- Are there hazardous wastes on site, i.e. is an abatement plan necessary?”

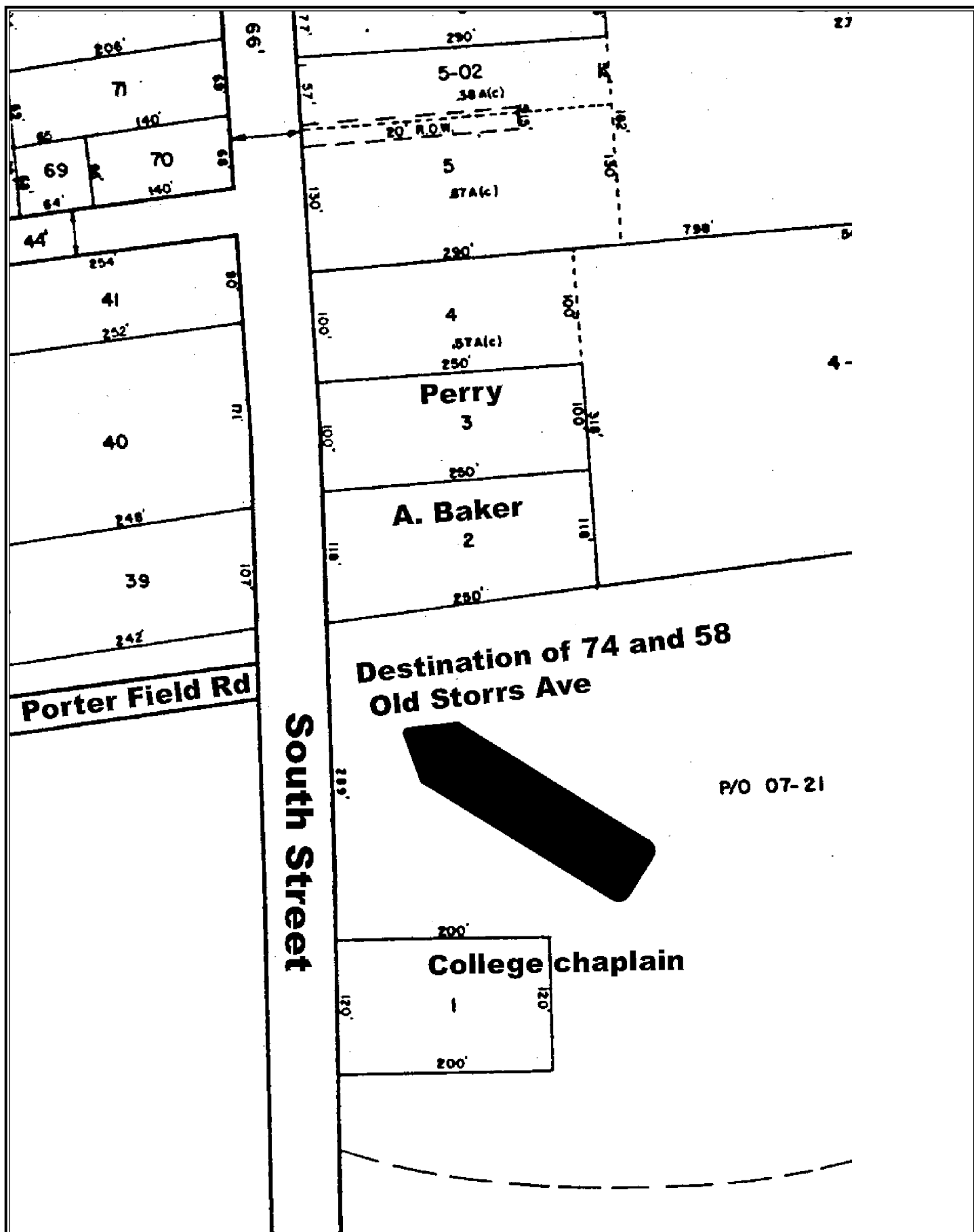
APPENDIX B

Historical and Planning Maps of the Old Science Center Site



Middlebury College and the old Science Center site, 1871, Beers Atlas of Addison County





Future site of two Old Storrs Avenue houses (labels added),
Middlebury Town Tax Maps

APPENDIX C

Excerpts from Joseph Battell's Will

Thereas it has been my intent in and by my last will and testament to make to said Middlebury College some very substantial gifts had the authorities thereof not persisted in placing the Warner Science Building, now in process of erection, on the low ground between the old college buildings and the road; it being my opinion that the same should have been erected on the high ground to the west, northwest, or north of said old college buildings with a view in the future to have beautifully located upon the upland as was hoped for by the founders of said college. Now if at the end of the twenty-one years from time of my decease said new Warner Science Building shall have been removed from its present site and located on the upland, west, northwest or north of the old college buildings, then and in that case it shall be the duty of my trustees to convey to said President and Fellows of Middlebury College such lands as they shall have purchased north of the highway north of said college, and thereupon to convey, pay over, and transfer to the President and Fellows of Middlebury College aforesaid, all the principal and entirely and all accumulations of said trust premises to be kept by them and their successors invested in such securities as are mentioned in the fourth clause above, or as invested when turned over to them by my trustees, and the net annual income used first as to One Thousand Dollars (\$1000.00) thereof each year, to supply the same to carry out the trust in favor of worthy young women, created by the eleventh clause of this will, such young women to be selected in that case by trustees of said college; keeping in mind that the object of this provision is to help such young women in grammar schools and high schools as well as in colleges; second to pay to the town and village of Middlebury Five Hundred Dollars (\$500.00) per year to be taken and used precisely as if said Battell Block were regularly assessed and the entire taxes thereon amounted to that sum each year; but this annuity shall only be paid if and when Battell Block is exempted from taxation; and third, to apply and use the balance of said net annual income for the general uses and purposes of said Middlebury College. And in the management of said trust premises the trustees of said Middlebury College, for the time being, shall have all the powers and discretions above granted to my three trustees by this will appointed.

But if at the end of twenty-one years from my decease said Warner Science Building shall not have been removed as above provided, then my trustees shall continue to hold said trust premises according to the terms of the original trust, selecting and assisting such young women as above provided, but not paying the annuity to the town and village of Middlebury; and to pay out and expend the balance of the net income thereof for such permanent public improvements in said town of Middlebury as my trustees, in their uncontrolled discretion shall choose and select. They may improve and beautify the margins of streets and highways in the village and town of Middlebury by planting trees thereon and otherwise. In case said Chipman Hill as above suggested, my trustees may in their discretion, contribute out of said income, current or accumulated such part as they think best of the expense of establishing, laying out, supporting and beautifying such cemetery. And my trustees may generally contribute out of said income for any worthy public object in said Middlebury that will add beauty and utility to said town, whether within or without the village, so that no such object shall be sectarian or any one of the proper and ordinary objects of support by taxation. Any my trustees shall not be bound to expend the whole of such net annual income in any one year, but may in their discretion hold and temporarily invest in such securities as specified in the fourth clause, not to exceed one half of such net income accruing in any year, any may use and apply such accumulated income as they might use and apply such current income; but no such reserved income shall be held to accumulate for more than twenty-one years before the same is applied to the purpose of this trust.

And it is my will that the brick building called Battell Block, at the foot of Merchant's Row in the village of Middlebury, shall not be sold but kept as a part of the trust estate herein created, to remain in the possession of my trustees, or of said college as the case may be; and I direct that they keep said block insured in a sum not less than Thirty Thousand Dollars (\$30,000.00), and in case of damage or destruction thereof by fire or lightning, to use the insurance money and any other available funds necessary, promptly to repair or rebuild the same.

And I direct my trustees or the trustees of said college, managers of said trust premises for any time being, to preserve the natural growth of wood and timber on a strip of land fifteen rods wide on either side of Otter Creek below the Paper Mill Falls in the towns of Middlebury, Weybridge, and New Haven, so far as I shall own such lands at my decease; also on all the woodland on the farm in Weybridge which I purchased of Edwin Lawrence, and on the farm in Weybridge which I purchased of the Willard estate, known as the Willard farm, and on the farm in Weybridge which I purchased of the Drake estate, known as the Drake farm which I bought of Middlebury College; also on all my woodland continuous to and west of the highway north of the Drake dwelling house. And all the woodland mentioned in this paragraph shall be kept open, under reasonable rules, to the public, for recreation grounds or parks forever.

